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GAS ILLUMINATION IN NEW YORK CITY, 1823-1863

by

Louis Bader

Approved
Boyd Still

A dissertation in the Department of History submitted to
the faculty of the Graduate School of Arts and Science
in partial fulfillment of the requirements for
the degree of Doctor of Philosophy at
New York University

June, 1970

to

Evriah, Raphael, Carroll

and little Sam

PREFACE

This study of gas illumination in New York City was undertaken at the suggestion of Professor Bayrd Still of New York University. During the course of my research and writing, Professor Still gave generously of his time in reading and commenting on my manuscript. I am deeply grateful for his guidance. I wish to express my gratitude to Professor Brooke Hindle of New York University for his advice on the technology of gas lighting; and to Professor Vincent P. Carosso for his suggestions on the economic aspects of my study.

I was given generous assistance by Miss Jeanette Range, Librarian of the Consolidated Edison Company, and her staff. Mr. John Nixon of the staff, was of inestimable assistance in locating materials that had not been consulted for 20 years. Mrs. Edith W. Finch, Librarian of the American Gas Association (in New York City) and her assistant, Miss Joan Cataldo, were also kind and helpful in providing important material. I was fortunate enough to have available the competent professional services of the Columbia University Library, the New York Public Library and the New York University Library. The New York Historical Society Library was a wonderful source for newspaper research; Mr. Tom Dunn of the newspaper desk was especially helpful. Mr. William Rose bore kindly and patiently with innumerable revisions while typing the manuscript. My wife Julia provided dedicated and inspiring assistance. Her labor was sometimes no less than my own.

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CHAPTER I

INTRODUCTION

Standing like beacons, the gas works of American cities in the first half of the nineteenth century quietly marked the beginning of a new era of technological and industrial progress. These unprecedented aggregates of capital and labor were a species of natural wonder in an urban landscape dominated by the small commercial establishment and manufactory.

But human memories are faulty. Successful technologies have a way of burying their outmoded predecessors as if the mere existence of the older forms would serve as embarrassing reminders of debts owed. So the invention of the automobile obliterated centuries of carriage shops and the artisans employed in them, and similarly the electric light relegated to the dimmest corner of the past the excitement and exhilaration produced by the "brilliant" light of the first gas lamps.

The manufacture of illuminating gas was introduced into the United States during the first quarter of the nineteenth century. The first successful gas light company in America was established in Baltimore in 1816. Boston

was next with a gas light company in 1822, New York in 1823 and Brooklyn in 1825.[1] By 1850 there were at least 30 companies,[2] most of them situated in major cities throughout the country including St. Louis and Chicago in the West, and New Orleans, Charleston and Vicksburg in the South.[3]

The decade following 1850 was one of spectacular growth. The number of gas companies in the United States increased to 297 by 1859. Total capital invested rose to $42,861,174 to supply a population of 4,857,000 through 227,665 private meters.[4] Gas lighting was the most important illuminating industry in antebellum America. Its annual product in terms of dollar value was greater than all other forms of illuminants combined: candles, oil, burning fluids, kerosene, etc.[5]

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[1] Oscar E. Norman, The Romance of the Gas Industry (Chicago: A.C. McClurg and Company, 1922), pp. 47-48. See pp. 159-174 for chronological summaries of the development of the gas industry.

[2] Arthur L. Hunt, "Gas, Manufactured," Twelfth Census of the United States, 1900, vol. X, Manufactures, Part IV, Special Reports on Selected Industries (Washington: United States Census Office, 1902), p. 705.

[3] Norman, Romance of Gas, pp. 47-48.

[4] Emerson McMillan, "American Gas Interests," in One Hundred Years of American Commerce, 2 vols. combined, ed. by Chauncey M. Depew (New York: D.O. Haynes and Co., 1895), p. 295.

[5] Victor Selden Clark, History of Manufactures in the United States, 3 vols. (New York: Published for the Carnegie Institution of Washington by the McGraw Hill Book Company, Inc., 1929), vol. I, p. 494.

The unique position occupied by gas companies in large urban centers may be more clearly illustrated by reference to the statistics of manufacturing in five leading American cities in 1859.[6] Taking New York, Philadelphia, Boston, Baltimore and Cincinnati, we find a total of 11 gas lighting companies with an invested capital of 11-1/2 million dollars and producing an annual output valued at 3.9 million dollars. For the number of plants involved, the capitalization and value of output indicated by these figures was enormous in antebellum America.

Broad general comparisons among the cities involved are difficult because of the nature of the gas industry but we note that the "clothing" industry of 1859 is the only source of urban manufactures which either exceeded gas or, as in the case of Boston and Cincinnati, was not far behind. Note, however, that for the five cities, the total capital investment in clothing, $13,400,000 with an annual output valued at $27,600,000, represented the work of 1,057 establishments, while in the production of gas only 11 establishments were involved.[7]

Even if we seek a better basis for comparison by using iron foundries or factories producing piano-fortes,

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[6] Leander Bishop, A History of American Manufactures From 1608 to 1860, vol. II (Philadelphia: Edward Young and Co., 1864), pp. 530, 583, 658, 797, 805.

[7] *Ibid.*

locomotives, or chemicals where heavy investment was accompanied by a smaller number of plants with fewer employees, the gap between such examples and gas is still a large one.[8] Each gas works and its distributive system of mains and pipes involved a large capital investment. State legislatures were reluctantly forced to grant new companies the power to issue capital stock for as much as one and two million dollars. We have omitted from our calculations the host of tributary factories, commercial establishments, and suppliers of raw materials which developed in response to the special needs of gas manufacture. These, too, contributed to the economically important role which gas works played in some cities and urban areas.

The significance of the gas lighting industry in 19th century America is often overlooked because of the usual habit of compiling economic data on a national, regional, or state-wide basis. Gas was an industry in its early years confined to urban centers and overwhelmingly concentrated in the largest cities. The 10 largest gas companies in 1859 constituted but a mere 3 per cent of the whole, but were responsible for 40 per cent of the capital invested and served 50 per cent of the population living in areas served by a gas company. They accounted for 37 per cent of all private meters in use and supplied gas to more than 60 per

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[8] Ibid.

cent of all public gas lamps in the United States.[9] But the importance of this new illuminant cannot be secribed purely in statistical or economic terms. The total human environment was affected by a light which came from a distant "manufactory," was not portable but was fastened to walls and ceilings, did not have to be snuffed like a candle but could be easily turned on or off by a stopcock, was measured in terms of cubic feet and, above all, introduced an intensity of illumination which was eventually to alter human needs and requirements.

The comparative neglect of these developments and the significance they held for determining the qulaity of life in the 19th century American city forms the justification for the pages which follow. Frederick L. Collins, chronicler of New York City's past, has stated:

> Far more important [than Fulton's steamboat] in its immediate effect on the development of New York City was the turning on of the gas. We of these electric lighted times incline to laugh at what we call "the gas light era," but the change from gaslight to electricity, marked though it has been, was as nothing compared with the change from darkness to light—for that is in effect what happened when, after two centuries of hesitation, man decided to build a

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[9] Emerson McMillan, "American Gas Interests," p. 295. The data for the total population residing in gas districts and the number of private meters and public gas lamps in the United States have been compiled from "John B. Murray and Co.'s Tables of the Gas-Light Companies of Cities and Towns, Corrected September 30, 1859," American Gas-Light Journal, I (October 1, 1859), 52-54.

> second story on his day. That decision, so far-reaching in its effects, has received little notice from historians, especially historians of New York City, who seem to have been content to treat it strictly as a commercial matter, note its happening as one might note the building of a new pier or warehouse, then turn off the gas and forget it. Actually the coming of a real illuminant was one of the most notable events in all history; and one of the most notable things about it was that its coming had been so long delayed.[10]

The impact of the introduction of gas lighting on urban life has nowhere been made the subject of a systematic and scholarly investigation. There are some half dozen books (as opposed to brief pamphlets) which deal with the history of particular gas companies. Many of these represent the work of officials or individuals associated with the companies involved. A few articles in journals and the insights supplied by company histories occasionally deal with the relationships between gas lighting and the life of the city, but aside from this, the subject has been virtually ignored.[11]

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[10] Money Town (New York: G.P. Putnam's Sons, 1946), p. 183.

[11] Outstanding examples of such histories are Thomson King, Consolidated of Baltimore, 1816-1950: A History of Consolidated Gas Electric and Power Company of Baltimore (Baltimore: Published by the Company, 1950), and Frederick L. Collins, Consolidated Gas Company of New York: A History (New York: Published by the Company, 1934). The latter study is based on an unpublished manuscript by John H.G. Pierson on the "Origins of the Consolidated Gas Company of New York" (undated but probably completed in the early 1930's) in the files of the Consolidated Edison Company of New York. Articles dealing with gas illumination in New York and other

The introduction of gas lighting into New York City seemed to be an appropriate place to begin. Although third in the line of cities to adopt gas light, New York rapidly became the center of the industry in the United States. In 1823, New Yorkers were so ignorant of the principles of the industry they were about to embark on, that they gave serious consideration to sending an agent to Baltimore to solicit advice from the older, more experienced company. In 1825, less than one year after the gas had been turned on in New York, Baltimore was sending to New York for fixtures and supplies which they found were better made here than elsewhere.[12]

The period to be covered by this study will begin, aside from necessary introductory materials on the origins of gas lighting in Europe and America, with the establishment of the first gas company in New York City in 1823 and will end in 1863. The features which give these years the homogeneity that justifies treating them as an "era" are

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cities may be found in the American Gas-Light Journal, first published in July, 1859 and continued since then under a variety of sub-titles and titles (present title is the American Gas Journal). See also the trade publication, Gas Logic, July, 1905-June, 1936, an organ of the Consolidated Edison Company of New York, Inc. (formerly the Consolidated Gas Company of New York).

[12] Minutes of the New York Gas Light Company, January 17, 1826, p. 33, MS in the files of the Consolidated Edison Company. See also February 1, 1828, p. 86.

the dependence on coal gas as a main source for the production of gas light and the limitation of gas companies in New York to the provision of their services to "gas districts" or specific localities within the city.

CHAPTER II

DISCOVERY OF "LIGHTING GAS"

Coal, when heated in a closed vessel, released a number of substances which had excited the curiosity and imagination of scientifically minded individuals in the seventeenth and eighteenth centuries. On such occasions, a mysterious "air" was given off which had the quality of bursting into flame when a lighted candle was held nearby. Some experimenters and observers had found this "inflammable air" issuing forth from springs, from fissures in the earth's surface and from cracks in the walls and floors of coal mine tunnels.[1]

One of the earliest and most systematic of such experimenters was Dr. John Clayton, an English clergyman who described his experiments with the distillation of coal in 1739 in the following manner:

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[1] For descriptions of the early experiments with the lighting properties of gases, see Charles Hunt, A History of the Introduction of Gas Lighting (London: Walter King, 1907), and King's Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas, ed. by T. Newbigging and W.T. Fewtrell, vol. I (London: William B. King, 1878), chapter I.

> I . . . got some coal from one of the pits . . . which I distilled in a retort in an open fire. At first there came over only *phlegm*, afterwards a black oil, and then likewise a *Spirit* arose which I could noways condense, but it forced my tube and broke my glasses. . . . I observed that the spirit which issued out caught fire at the flame of a candle, and continued burning with violence as it issued out in a stream, which I blew out, and lighted again, alternately, for several times.[2]

Dr. Clayton also found that the "spirit air" could be stored in bladders for a considerable time without losing its inflammability, and what made the whole thing so remarkable was that he could not discern "any difference in the appearance between these bladders and those which are filled with ordinary air."[3]

In 1767, Dr. Richard Watson performed a similar experiment and undertook to ascertain with exactitude the components of distilled coal. He wrote:

> I took 96 ounces of coal and putting them into an earthen retort, distilled them with a fire gradually augmented until nothing more could be obtained from them. During the distillation, there was a frequent occasion to give vent to an elastic vapour which would otherwise have burst the vessels employed in the operation, and the result was as follows:

Weight of Newcastle pit coal ...		96 ounces
Weight of the products	Liquid	12 ounces
	Residue	56 ounces
	Loss of Weight	28 ounces
		96 ounces

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[2] Walter Thomas Layton, *The Discoverer of Gas Lighting: Notes on the Life and Work of Reverend John Clayton, D.D., 1657-1725* (London: Walter King Ltd., 1926), p. 48.

[3] *Ibid*.

> The matter which is lost during the distillation of both the wood and pit coal has been called air. It does not begin to be separated from wood or coal till the lighter of the two oils appears and then it rushes out with great violence, and unless a proper vent be given to it, the strongest vessels will be burst by it.[4]

The latter half of the eighteenth century was a period of great activity in chemical research. Despite the discoveries about the nature of gases as reflected in the work of Joseph Black, Joseph Priestley, Henry Cavendish and others, practical applications for the gases obtained from the distillation of coal, tar, wood and other substances remained a problem to be solved by engineers and inventors.[5]

Jean Pierre Minkelers, a Dutchman who held the post of Doctor of Philosophy at the University of Loukin in Belgium, had performed experiments by means of which he obtained gas and used this gas to light his lecture room from 1783 onwards.[6]

Philippe Lebon, another of the early pioneers of gas lighting, began his experiments by the distillation of sawdust to produce a lighting gas. These experiments which took place during the 1770's led to the granting in 1799 of

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[4] King's Treatise, I, 10.

[5] Partington, J.R., A Short History of Chemistry (3rd ed. rev.; New York: Harper & Brothers, Harper Torchbook, 1957). See chapter VI, "Discovery of Gases."

[6] E. Adry, "Discovery of Lighting Gas," Gas Journal (London), CXII (December 30, 1925), 847-848.

a patent for a "New Method of Employing Fuel (combustible) With Greater Utility Either for Heating and Lighting, and to Obtain Certain Products Therefrom."[7] There is some question as to whether the apparatus described in the patent specification would have yielded a practicable system of gas lighting. Additions to his original patent in 1801 seemed to indicate that the "thermolamp," as Lebon's stove came to be called, was principally a method for the production of gases which could be used for many purposes, gas lighting being only one.[8]

The prospectus which Lebon issued for the public in 1801 contained a popularized version of his invention and an explanation of the manner in which it could be used for the lighting of homes. Small pipes or chimneys one-inch square or even tubes of oiled silk with metal extremities were to be embedded in the walls or ceilings of homes emerging at designated points in the form of gas jets. "A single stove may thus supersede all the chimneys of a house, the inflammable gas from it being conveyed everywhere to give the most sensible heat and the softest light."

> Soft and pure, this light may be moulded into every shape, into flowers, festoons, etc., every form suiting the flame which may descend from a ceiling

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[7] King's Treatise, I, 10.

[8] Ibid., p. 11.

> in the shape of a chalice of lowers, and spread above our head a clear light not masked or shaded by any support whatever, darkened by no wicks, or tarnished by the least black smoke.[9]

In addition to its use as a medium of decorative lighting, Lebon advised the use of inflammable gas as a means of cooking and heating. "Who would not be charmed with the service of a flame so complaisant; willing to roast and boil our victuals; our cooks no longer exposed to the fumes of charcoal; and those victuals it is ready to keep warm on our tables. It dries our clothes and linen and warms our baths."[10]

In 1802, Lebon exhibited gas lighting at a house in Paris by means of his thermolamps. Among the thousands who visited the widely publicized exhibition was Frederick Albert Winzler who had journeyed from Frankfort for the purpose. Failing in his efforts to purchase a Thermolamp, Winzler familiarized himself with the details of Lebon's technique and was able shortly thereafter to put this information to good use in the establishment of a gas lighting company in England.[11]

William Murdock, a Scotch engineer employed by the English firm of Boulton and Watt, was the first to develop a

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[9] Hunt, History of Gas Lighting, p. 54.

[10] *Ibid*.

[11] *Ibid*., p. 58.

system of gas lighting which was successfully used for the lighting of factories and commercial establishments.[12] Murdock had begun to experiment with gas lighting while assigned as a county agent by Boulton and Watt to the Scottish village of Redruth (in Cornwall). He distilled a number of vegetable and mineral substances and produced enough gas to light his office.[13]

In 1798 he was transferred to the Soho foundry of Boulton and Watt in Birmingham where he constructed equipment which was used to light several of their buildings. For the next several years he attempted to perfect this process. An important advance was made by Murdock when he devised techniques to purify the gas and to eliminate objectionable odors. In 1802 the Peace of Amiens was celebrated by a public display of gas lighting when Murdock illuminated the Soho factory. The "illumination" in an age of darkness was a favored and exciting way of celebrating important events. Later, when the introduction of gas became a possibility, some argued against the new form of light on the grounds that if the streets were brightly lit on a daily basis, an "illumination" would become pointless, thereby

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[12] Dictionary of National Biography, s.v., "Murdock, William."

[13] Dean Chandler and A. Douglas Lacey, The Rise of the Gas Industry in Britain (London: British Gas Council, 1949), p. 13.

weakening an important form of patriotism.[14] Murdock's brilliant lighting of the Soho premises excited the wonder of the citizens of Birmingham. William Matthews, an early authority on gas lighting, reported:

> The writer was one among those who had the gratification of witnessing this first public exhibition of gas illumination and retains a vivid recollection of the admiration it produced. . . . Birmingham poured forth its numerous population to gaze at and to admire this wonderful display of the combined effects of science and art.[15]

After Murdock's successful illumination at Soho, the firm of Boulton and Watt decided to embark upon the construction of gas-making apparatus. Contracts were secured in the next few years for the lighting of a number of textile enterprises. Murdock was asked to superintend the construction of a system of gas lighting for the large textile firm of Phillips and Lee of Manchester which he undertook during the years 1805 to 1807. In 1808 Murdock contributed to the Royal Society a paper entitled "An Account of the Application of the Gas from Coal to Economical Purposes"[16] discussing

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[14] William Paul Gerhard, The American Practice of Gas Piping and Gas Lighting (New York: McGraw Hill Publishing Co., 1908), p. 23.

[15] An Historical Sketch of the Origin, Progress and Present State of Gas Lighting (London: Rowland Hunter, 1827), p. 23.

[16] This document has been reproduced in King's Treatise, I, 22-24.

the gas works he had installed at Phillips and Lee. Coal was first distilled in large iron retorts and then conducted through pipes to large reservoirs or gasometers where the gas was washed and purified before being further discharged into a system of distributor pipes called gas mains. Narrower gauge pipes were used to siphon the gas from the mains and then used to light individual rooms. The "burners" or gas jets were nothing more than perforations (a thirtieth of an inch in diameter) in a conical shaped fitting. One perforation at the point of the cone and two lateral ones caused three divergent jets of flame to assume the shape of a fleur-de-lis. This widely used early-type gas jet controlled by a "cock" (tap or faucet) was given the name of "cockspur burner."[17]

Murdock went into great detail to establish the cheapness of gas lighting as compared with illumination by candles. He assumed that gas light would be used only two hours daily requiring the production of 2,500 cubic feet of gas per day. The cost of production of coal gas depended on the "interest of capital," the wear and tear of apparatus and the cost of coal. This would be offset to a considerable degree by the value of the coke which remained as a residue after coal had been subjected to distillation. An equivalent light by candles would cost more than three times the amount required

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[17] Ibid., p. 23.

for gas lighting. Extending the time used for lighting further increased the advantage of coal gas over candles.[18] He stressed further the superiority of the light obtained by gas:

> The peculiar softness and clearness of this light with its unvarying intensity have brought it into great favor with the work-people, and it being free from the inconvenience and danger resulting from the sparks and frequent snuffing of candles, is a circumstance of material importance, as tending to diminish the hazard of fire, to which cotton mills are known to be much exposed.[19]

Boulton and Watt constructed a number of other gas works during the period but their main interest was, of course, the steam engine; hence the gas business always remained a subsidiary activity with them. In addition to Murdock, the firm also had the services of Samuel Clegg who was the first to propose the use of lime as a gas purifier. Clegg eventually left Boulton and Watt to devote himself fully to the design and construction of gas making apparatus and later played a major role in the success of the first English gas lighting company.

Public interest in gas lighting was stirred in the fall of 1803 and winter of 1804 by a series of lectures and demonstrations at the Lyceum Theater. The lecturer was a German immigrant, Frederick Albert Winzler (later changed to

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[18] Ibid.

[19] Ibid., p. 24.

Winsor), whom we have mentioned earlier in connection with the Lebon exhibition. Winsor showed great energy and imagination in his promotion of gas as a source of heat and light and almost from the beginning he advocated its adoption on a national scale. By means of pamphlets and newspaper advertisements, he held out the promise of fabulous profits to investors. His personality and extravagant claims aroused controversy. While some critics of his lectures professed to be both bored and shocked at his lack of scientific knowledge, large crowds of Londoners visited the Lyceum Theatre to see and hear about the marvels of gas.[20]

On stage Winsor exhibited a furnace in which coal was distilled into gas. The gas was led by pipes into a condensing unit which "purified" it and then into a large pipe which crossed the width of the stage and onto which were fastened gas jets of various shapes and sizes. In the pit below, an assistant read the master's notes in English as Winsor conducted a number of experiments on stage. Among these was a demonstration that "the intensity of the flame of coal gas rendered it less liable to be extinguished by strong and sudden gusts of winds." He also showed that "if properly managed, the burning of it would neither produce smoke, nor throw out such sparks as often fly from the

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[20] Chandler and Lacey, Gas Industry in Britain, p. 30.

burning wicks of lamps or candles."[21] Winsor's showmanship and flamboyancy brought gas lighting to the public's attention. The experiments which followed his debut as a lecturer were to arouse even greater interest.

In 1806 the inventor and publicist moved his apparatus and equipment to 97 Pall Mall. The house on this site was converted into a workshop and on January 28, 1807 a portion of the street in Pall Mall was lighted with gas by means of underground pipes issuing from Winsor's house. A second house was obtained nearby and Winsor soon after announced the existence of two houses fitted up as "standards for the general introduction of Gas Lights clarified to their utmost brilliancy."[22]

At about this time, Winsor also announced his grandiose scheme (even if we make allowance for the common tendency of the time to exaggerate unabashedly the supposed effects or results of particular "inventions") for the formation of a "National Light and Heat Company for providing our streets and houses with Hydrocarbonic Gas Lights on similar principles as they are now supplied with water."[23] The domain of this company was to be nothing less than the entire United Kingdom, and Winsor conveniently affixed to

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[21] Matthews, Historical Sketch of Gas Lighting, p. 30.

[22] Hunt, History of Gas Lighting, p. 101.

[23] Ibid., p. 102.

the circular in which the scheme was announced estimates of national costs and net annual profits to be realized. A nominal capital of one million pounds sterling was proposed to aid in the establishment of the new company.

A new principle had thus been injected into the consciousness of those who pioneered in the introduction of this new form of light. Winsor clearly pointed the way for the provision of a public supply of gas by his proposal to provide "Streets, Squares and Houses with Gaseous lights by means of conducting tubes underground from distant furnaces."[24] Murdock, Clegg and others had devised gas plants to light single establishments. Winsor was proposing in effect to establish a central station from which gas would flow out to all those who would make use of it.

Winsor's attempt to attract capital and influential supporters for his new company resulted in a steady stream of handbills, circulars, pamphlets, newspaper correspondence and public displays of gas lighting. His most spectacular display was the illumination he erected in honor of the birthday of George III in June 1807. The King's residence at Carleton House was across the street from Winsor's Pall Mall residence. Accordingly, pipes were run underground from Winsor's house into the King's garden and then placed atop the wall encircling the garden. Three dozen burners

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[24] Ibid., p. 103.

were attached to these pipes to provide light for the display. Over the garden entrance was an illuminated transparency bearing an ode to the King.[25]

The June demonstrations having excited the city of London, the list of subscribers to Winsor's National Light and Heat Company continued to grow. In July of 1807, a secret committee of the subscribers met to verify the safety and practicability of Winsor's "Patent Light and Heat Stove." They appeared satisfied with the explanations and the experiments performed and decided to use ₤20,000 or one-fifth of the amount subscribed to light a street in London and Westminster on a demonstration basis in order to secure a charter. Twenty-five "respectable" persons were named as trustees to carry out the plans of the secret committee.[26]

The trustees now petitioned the King for a charter. In doing so they were following the custom of the times, which allowed companies heavily identified with the public interest to be set up on a limited liability basis and given the exclusive privilege of carrying out the intended objects of their incorporation. Similar practices had been carried out with regard to water companies established some years earlier.

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[25] See Chandler and Lacey, Gas Industry in Britain, pp. 32-35 for a careful reconstruction of the scenes and events in the lighting of Pall Mall.

[26] Hunt, History of Gas Lighting, p. 116.

An act of Parliament was necessary before a royal charter could be issued. At the Parliamentary Committee of Enquiry on the proposed bill, in May, 1809, William Murdock, James Watt, Jr. and others testified in opposition to the bill. They based their argument on three important principles: first, that gas lighting had not been invented by Winsor and that, therefore, a claim for exclusive privileges should be denied; second, that formation of a company of the size and capitalization proposed would drive competitors from the trade and force abandonment of gas-making enterprises already in existence; and third, that the granting of limited liability would create an enterprise less responsive to competition and therefore one less efficient and more given to wasteful practices. These objections reflected the fear of firms like Boulton and Watt that they would be unable to compete with the proposed monster gas company.[27]

Frederick Accum, a "chemist" in the employment of the company, testifying on behalf of the bill, stated that Winsor's stove produced a superior type of pure odor-free light and also by-products of an exceptional quality which would be much sought after by industry. He was speaking of coke, tar, "essential oil" and ammoniacal liquors.[28] Asked

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[27] Stirling Everard, The History of the Gas Light and Coke Company, 1812-1949 (London: Ernest Benn Ltd., 1949), p.24.

[28] Essential oils are oils rich in hydrocarbons. Ammoniacal liquors are the watery residue of the coal gas

to explain why the stove was able to do this, Accum was vague and to this as in a number of other questions he testified that he would be unable to answer on the grounds of it being either a "secret" or information for which he should be paid a professional fee. Accum's remarks and his lack of knowledge on a number of points opened him up to ridicule and played a part in defeating the bill. The deciding factor, it has been said, was a witty and sarcastic speech delivered by a member of Parliament in which Winsor's financial claims were compared with those of the South Sea Bubble.[29]

The fears of "monopoly" expressed by a number of witnesses as a result of the wide scope of the proposed company must have been similarly important. Winsor's public relations campaign in 1807 and 1808 had proposed a capitalization of ₤1,000,000 for a company that would use gas to light the British Isles and her possessions. The Bill of 1809 proposed a capitalization of ₤500,000 and the less ambitious proposal to light England with gas. In 1810, due to the persistence of the trustees and Winsor's backers, a bill did finally get through Parliament but the original scheme had been sharply altered. The new company, called in this bill the London

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distillation process rich in ammonia and ammonia compounds. See The Condensed Chemical Dictionary, 7th edition, ed. by Arthur and Elizabeth Rose (New York: Reinhold Publishing Corporation, 1966).

[29] Everard, Gas Light and Coke Company, p. 24.

and Westminster Gas Light and Coke Company, was limited to a capitalization of ₺200,000 and confined to lighting London. A royal charter was issued in 1812 and a reorganization of the company in the same year resulted in the issuance of a prospectus which proclaimed that "Practice has established that Gas can be used instead of Tallow or Oil both in Houses and Manufactories with Safety and Economy . . . the Manufactories in which Gas is burnt in the North pay considerably less to the Officers for Insurance than those in which Tallow and Oil are consumed."[30] Public confidence in gas lighting was considerably increased by reports of its greater safety.

A second meeting of the directors, expressing impatience with the lack of progress, asked Winsor to submit concrete proposals for establishment of a gas works. Winsor countered with demands for adequate compensation and satisfaction of prior claims on the company. The bitterness evoked by this meeting ended the relationship between Winsor and the directors. The fiery publicist soon left for France and the company was faced with an engineering crisis. After some preliminary failures, the directors were fortunate enough to secure the services of Samuel Clegg, Murdock's assistant at Boulton and Watt when that company had constructed gas plants for private firms. Clegg's installation of gas lighting in 1812 in Rudolph Ackerman's print shop in

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[30] *Ibid.*, p. 27.

the Strand brought him to public prominence and the attention of the company. Under Clegg's guidance, the company finally began to make progress.[31]

The difficulties surrounding the early establishment of gas-making plants at this time were immense. The company as well as the public often showed little understanding of the substance they were proposing to use. It was believed that gas could not be distributed through pipes for more than a short distance. Hence, when a parish made a request for gas lighting, the company and its agents scoured the neighborhood looking for vacant yards or alleys where a gas-making plant might be erected.[32] Another difficulty lay in the fear of an explosion of the gasometer or gas storage chamber. In 1813 an explosion of the Peter Street works of the company resulted in the dispatch of a Parliamentary delegation to investigate the matter. Clegg was able to resolve some of their fears by conducting a demonstration on the plant premises but the recommendations of the committee that gasometers be secured in small strong buildings promised to add materially to the costs of construction.[33]

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[31] Chandler and Lacey, Gas Industry in Great Britain, p. 49.

[32] Everard, Gas Light and Coke Company, p. 38.

[33] Great Britain, House of Commons, Select Committee on Gas-Light Establishments, Report of the Select Committee on Gas-Light Establishments (London, 1823).

No little difficulty was created by the resistance of manufacturers to comply with orders for pipes and tubing needed to fit up a system of gas light. The costs of fittings from sheet iron and copper were excessive. There was great hesitation in investing in or adapting machinery to produce anything connected with what some described as so "foolish and unlucky a thing as gas."[34]

In 1813 the Gas Light and Coke Company which had come to be popularly known as the "Chartered Company" installed the first public gas lighting with the illumination of the Westminster Bridge. The regular force of lamplighters, accustomed only to oil, refused, at first, to light the gas lamps. Clegg, engineer of the Chartered Company, was forced to make the rounds, lighting each lamp by means of a flaming torch. The first parish to have gas street lamps was St. Margarets, Westminster, in 1814. Crowds of curious people followed the lamplighters on their rounds. As word of the success of gas spread, the proprietors of shops and owners of private houses were suddenly willing to pay substantially for what they had earlier refused to accept as a gift.[35]

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[34] Samuel Clegg Jr., Practical Treatise in the Manufacture and Distribution of Coal-Gas 4th edition (London: Trubner and Co., 1868), p. 21.

[35] North British Association of Gas Managers, Light Without a Wick: A Century of Gas-Lighting, 1792-1892: A Sketch of William Murdoch, the Inventor (Glasgow: The University Press, 1892), p. 47.

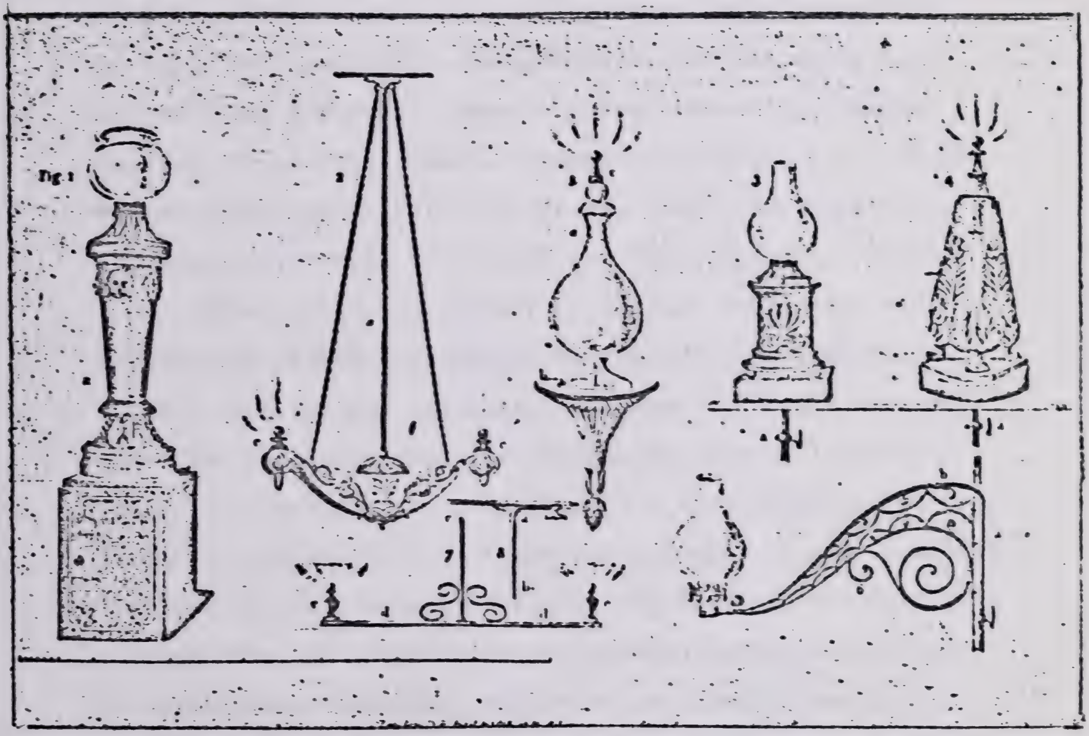

Figure 1

Samples of Gas Fittings as Illustrated in Accum's "Treatise on Gas Lighting," 1815

In 1817, the Chartered Company declared its first dividend of 6 per cent. A year later it was 8 per cent. By 1823 the company had 120 miles of mains and produced 250 million cubic feet of gas annually at three gas works. New companies were rapidly being formed to light the city. In 1816 The City of London Gas Light Company was incorporated. By 1823 there were seven gas companies and gas works in operation in and about London. Seven thousand gas lamps lighted 215 miles of London streets and more than 60,000 gas burners had been installed in London homes. Gas was being consumed at the rate of 400 million cubic feet per year.[36]

The spread and mastery of the new technology was facilitated by the publication in 1819 of technical handbooks by English gas engineers outlining in detail the construction and procedures for the manufacture of illuminating gas. T.S. Peckston, in 1819, issued a text which ultimately became a classic, on the theory and practice of gas lighting.[37] Peckston, who had replaced Clegg as engineer for the Chartered Company when the latter resigned in 1817 (over the question of salary) described the process of gas manufacture in a

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[36] Philip Chantler, The British Gas Industry: An Economic Study (Manchester: Manchester University Press, 1938), p. 5.

[37] The Theory and Practice of Gas-Lighting: In Which is Exhibited an Historical Sketch of the Rise and Progress of the Science and the Theories of Light. (London: T. and G. Underwood, 1819).

manner which was said to have influenced the design and operation of gas works to the end of the nineteenth century.[38]

The manufacture of coal gas involved three sets of operations: (1) reduction of coal to a gaseous state—distillation, (2) the separation of water, tar and other condensable materials—condensation, and (3) the removal of sulphur compounds and carbonic acid—purification. The entire process began with the introduction of coal into long, horizontal, semi-cylindrical forms made of cast-iron (and of clay after 1849) and called "retorts." The coal placed in the retorts was usually some form of bituminous coal, cannel and Newcastle coal being the most popular, which was heated between 3 1/2 to 6 hours (depending on the particular coal being used) to a dull cherry red (1478° F.), at which time the gas produced was allowed to leave the retort to enter into a condensing unit.

The condensers consisted of a series of pipes which were subjected to cooling action either by exposure to air or by immersion in water. Cooling the gas brought about a separation of coal tar and other substances which descended to the bottom of the condenser while the gas moved upwards to the next stage. Additional cleaning action was attempted

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[38] Arthur Elton, "Gas for Light and Heat," in _A History of Technology_, ed. by Charles Joseph Singer et al., 5 vols. (Oxford: Clarendon Press, 1954-58), vol. IV, _The Industrial Revolution, c. 1750 to c. 1850_ (1958), p. 270.

by exposure of the gas to jets of water in a device called a "washer." A "scrubber" usually completed the process by having the gas pass through a chamber filled with coke, firebrick or paving stones, kept constantly wet by a spray of water.

Purification was the final stage of manufacture and involved an effort to remove sulphur compounds and carbonic acid. This was first attempted by the "wet lime process" in which the gas was forced through milk of lime. The foul lime which remained was called "blue billy" and was so offensive that it often overcame the workers in the gas works. It created endless problems of disposal as its discharge into nearby rivers and streams was forbidden as soon as the community surrounding the works was made aware of its presence.

After purification, the gas was conducted into a gas holder or gasometer where it remained until ready for use. Gasometers may be described as inverted cylinders suspended in water. The passage of gas upwards into the cylinder caused it to rise, or to be lowered when the process was reversed. Upon leaving the gasometer, the gas moved through a "regulator" which regulated the flow so that the gas flowed through street mains at an even pressure. The product which emerged from the gas jet was free of objectionable odors, and gave a clear bright flame without smoke.[39]

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[39] This description of coal gas manufacture was taken chiefly from Frederick Chandler, The Chemistry of Gas Lighting,

By 1823 the public's attitude towards lighting by gas had greatly changed. A letter to The Sun of May 13, 1823, suggests the nature of the gas-lighting revolution in English homes and streets:

> I have it in every part of my house, to the entire exclusion of tallow and oil, my chamber and nursery having the light burning regularly through the whole night. The health of my family has not in the least suffered from it, and the use of it in the drawing and dining room appears to tend to preserve the original appearance of delicate coloured chintz, furniture, carpets and gilt ornaments. . . . Its convenience, safety, cleanliness and avoidance of grease spots renders it so desireable, that though its expense might be treble what it is now, and the great economy now experienced, not to be felt. I would certainly not desist from the use of it.[40]

(Philadelphia: n.p., 1876), pp. 9-23 (a pamphlet). See also "Gas-Light," Encyclopedia Britannica, 8th edition, vol. X (Boston" Little, Brown, and Co., 1866), pp. 409-34, for a comprehensive and profusely illustrated description of the process of coal gas manufacture in mid-19th century. A popularized but well written account of the relationship between the early manufactured gas industry and the gas industry of the 20th century may be found in O. E. Norman, The Romance of the Gas Industry (Chicago: A. C. McClurg and Company, 1922). See also, Louis Stotz and Alexander Jamison, History of the Gas Industry (New York: By the author, 1938).

[40] Gas Light and Coke Company, An Account of the Progress of the Company...1812-1912 (London: Waterlow Brothers and Layton Ltd., 1912), p. 33.

CHAPTER III

AMERICAN GAS PIONEERS

The development of gas lighting in the United States was based primarily on the search for more adequate forms of public street lighting. Public street lighting in the United States began with the issuance of an historic ordinance by the Common Council of the city of New York, towards the close of the seventeenth century. By the late 1690's New York had become a flourishing commercial community boasting nearly 1000 houses, a sailing fleet of 60 ships, 40 boats and 25 sloops, and an annual revenue of ￡5,000.[1] The Common Council had laid out streets and highways and had provided a specialized night watch made up of four "sober, honest" men to make nightly rounds of the expanding city during the winter months.[2] On November 23, 1697, the council enacted the first

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[1] James Grant Wilson, ed., Memorial History of the City of New York, vol. I (New York: New York History Co., 1892), p. 496.

[2] Carl Bridenbaugh, Cities in the Wilderness: The First Century of Urban Life in America, 1625-1742 (1938: paperback ed., New York: Capricorn Books, 1964), p. 154.

specific provision for street lighting in British America.[3] Up to this time, the only source of light on darkened streets was the watchman's lantern or a bonfire in the area of the watch houses. The new ordinance read:

> The board taking into Consideration the great inconveniency that attends this Citty being a trading place for want of having lights in the Dark time of ye moon in the winter season itt is therefore Ordered that all and every of the housekeepers within this Citty Shall put out lights in their Windows fronting ye Respective Streets.[4]

Responsibility for enforcing this ordinance was placed on the Mayor, two aldermen and two assistants. The penalty for neglect of one's duty was a cost to the householder of nine pence for each night of default.[5] On December 2, 1697, the Council modified its original instructions. Every seventh house in the wards of the city was to be required to hang out a lanthorn and a candle on a pole until the 25th day of the following March. The expenses involved were to be shared equally among the seven households. The alderman and assistant for each ward would see that the lamp was lit, as originally stated, "in the Darke Time of the Moon," and the penalty for non-compliance would be imposed on the person whose turn it had been.[6] While the

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[3] Minutes of the Common Council of the City of New York, 1675-1776, vol. II (New York, 1905), p. 20 (hereafter cited as NYMCC, 1675-1776).

[4] Ibid., p. 21. [5] Ibid. [6] Ibid., p. 23.

Common Council felt the need for action, it did not wish to assume a burden which would have sorely taxed its revenues. The costs of lighting the public streets were thus borne by the private citizens for over half a century.[7]

New York's action placed it for the time being, ahead of other American cities. In entering the age of street lighting by lanterns, however, it was merely following practices which had prevailed in the cities of London and Paris for at least a century earlier.[8] During the early part of the 18th century, street lighting in New York expanded as increasing numbers of private citizens affixed metal brackets and oil lamps to the sides of houses illuminating the streets on which they lived.[9] Street lighting at public expense was begun in 1752 when the Common Council ordered three oil lamps to be placed around City Hall.[10] Whale-oil lamps were mounted on wooden posts in several streets of the

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[7] Arthur Everett Peterson, New York As Eighteenth Century Municipality Prior to 1731 (New York: Longmans, Green and Company, 1917), p. 104. Bound with George William Edwards, New York As An Eighteenth Century Municipality, 1731-1776. (New York: Longmans, Green and Company, 1917).

[8] William T. O'Dea, The Social History of Lighting (London: Routledge and Kegan Paul, 1958), p. 94.

[9] Isaac Newton Phelps Stokes, The Iconography of Manhattan Island, 1498-1909, 6 vols. (New York: Robert H. Dodd, 1915-1928), vol. IV, p. 630.

[10] NYMCC, 1675-1776, vol. 5, p. 358. See also, Edwards, New York As an Eighteenth Century Municipality, p. 125.

city by the Council in 1762.[11] As the century drew to a close, the Council ordered the Street Committee to place oil lamps on streets throughout the city, either on lamp posts or on the sides of houses, depending on whether the streets were wide or narrow.[12]

Philadelphia was slow to follow New York's example. Despite the hazardous and wretched condition of her streets, it was not until 1749 that a group of her citizens met and pledged themselves to institute a voluntary system of household lighting such as New York had enjoyed by 1700.[13] The scheme appears to have been highly successful. An English traveller who visited the city a year after its adoption remarked that the city "only wants the Streets to be Paved to make it appear to advantage, for there is few Towns, if any, in England that are better Illumined with lamps and those of the best Sort."[14] The Assembly of Pennsylvania passed an act in the same year providing for better

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[11] Rodman Gilder, The Battery: Four Centuries on Manhattan Island's Tip (Boston: Houghton, Mifflin Company, 1936), p. 147; Manual of the Corporation of the City of New York, 1856, comp. by David Thomas Valentine (New York, 1856),p.516.

[12] Minutes of the Common Council of the City of New York, 1784-1831, vol. V (New York, 1917), p. 633 (hereafter cited as NYMCC, 1784-1831).

[13] Carl Bridenbaugh, Cities in Revolt, Urban Life in America, 1743-1776 (1955; paperback ed., New York: Capricorn Books, 1964), p. 33.

[14] Ibid.

regulation of the watch and for more light in streets, lanes and alleys. The city was given the power to appoint a committee of six wardens who were to determine the number of lamps needed and their location. The committee of wardens was further empowered to arrange for the construction of the public lamps and for the hiring of a force of lamplighters to light and maintain the lamps.[15]

Boston had no system of public street lighting during most of the 18th century. A civic minded merchant, Eleakim Hutchinson,donated a lantern to the town in 1719 and the selectmen ordered Sands Gibben to keep the town lantern "well fixed with lights on all dark and stormy nights,"[16] but there were no other references to street lighting in the town records for over half a century.[17] An article in the Boston Newsletter, in February, 1772, called for a system of public lamps so that those who go out at night on calls of friendship or humanity might be protected from "insult, abuse and robbery." The public lamps, it was further argued, would deter "scenes of lewdness and debauchery which are so frequently committed with impunity at present."[18] At a Town Meeting, a month later, a committee of John Hancock and six

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[15] Edward D. Allinson and Boies Penrose, Philadelphia, 1681-1887: A History of Municipal Development (Philadelphia: Allen, Lane and Scott, 1887), p. 36.

[16] Leroy L. Thwing, "Boston Street Lighting in the Eighteenth Century," Old Time New England, XXVIII (1937), 72.

[17] Ibid. [18] Bridenbaugh, Cities in Revolt, p. 242.

other citizens was appointed to report on the number of lamps needed to light Boston. The committee recommended the purchase of 400 lamps to be paid for by a tax on liquor dealers, wheeled carriages and "vendue masters."[19] The lamps arrived from England in 1773 and by the spring of the following year, 310 had been erected in front of shops and warehouses. They were lit for the first time on March 2, 1773 and were warmly greeted by the citizens.[20]

New York and other American cities borrowed freely from London in establishing their street lighting systems. A letter to a New York City newspaper in 1771 by a gentleman who described himself as a "Friend to the Arts" called the attention of city officials to street lighting practices in the British city. The rules established for lighting the streets of London required:

> The lamp to be ten feet high.
> The distance from each other, fifty feet.
> The distance from the houses, four feet.
> The diameter of the Globe Lamp, ten inches.[21]

The technology of the oil lamp was significantly advanced by the invention of the Argand burner around 1782.

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[19] Thwing, "Boston Street Lighting," p. 77.

[20] Bertram K. Little, "Street Lighting," The Chronicle of Early American Industries (Early American Industries Association), III, No. 17 (October 1948), p. 149.

[21] Stokes, Iconography, IV, 984.

In place of the flat wick, Aimé Argand of Geneva devised a circular wick held between two concentric tubular metal frames and surmounted by a glass chimney. This encouraged a flow of air up through the center of the wick and the lamp, creating a more efficient combustion and greater intensity of light.[22]

A final important development was the steady increase in the costs of lighting due to increased demand for sperm and whale oil as illuminants. The deep concern felt by municipal authorities in regard to this problem may be illustrated by the remarks of New York's Council early in 1814:

> It appears that the ordinary expenses of the City have been advanced only in proportion to its increase and population, except those charges which are included under the head of Lamps and Alms House which have considerably augmented in consequence of the enhanced price of Oil for the former and of almost every article required for the latter. . . .
>
> To light this City the ensuing year even at the present price of oil is barely within the power of the Corporation, and as the present situation of affairs indicates a deficiency of supply and consequent increase in price of that article it is all important that measures be immediately adopted either to procure a substitute or to restrict its use to seasons of the first necessity.[23]

The special circumstances in which this comment was made included scarcities brought on by the War of 1812 but

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[22] William T. O'Dea, The Social History of Lighting (London: Routledge and Kegan Paul, 1958), pp. 49-51.

[23] NYMCC, 1784-1831, VII, 659-660.

its basic message was especially applicable to the early years of the 19th century when oil prices showed significant increases.[24]

Public street lighting became a major item of expenditure in municipal budgets ranking behind the Alms House and the Watch. Economy minded aldermen showed great reluctance to extend the days and hours of lighting.[25] A report to Common Council on March 13, 1809 indicated that New York streets were lighted by a total of 1653 lamps of which 97 were classified as private.[26] A memorial by the Common Council addressed to the state legislature pleading for special taxes estimated the cost of lighting the city for the ensuing year at $21,000, a sum representing approximately 9 per cent of total city expenditures.[27]

Philadelphia was the only other major American city which had a street lighting system rivaling New York's. During a similar period (1809), there were 1132 public street lamps requiring the annual expenditure of 14,355 gallons of

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[24] Walter S. Tower, A History of the American Whale Fishery (Philadelphia: University of Pennsylvania Press, 1907), p. 128.

[25] Sidney Irving Pomerantz, New York, An American City, 1783-1803: A Study of Urban Life (New York: Columbia University Press, 1938), p. 307.

[26] NYMCC, 1784-1831, V, 476.

[27] *Ibid.*, p. 400.

oil. The cost of "watching and lighting" the city was some $20,000. Except for the lamps in the vicinity of the "market houses" which were lit every evening at dusk and allowed to continue burning until daylight, the remaining public lamps were lit only on nights when the moon failed to give sufficient light.[28]

These were the conditions during the 18th century which intensified the search in major American cities for improvements in street lighting which would give more light for less cost. Foremost among those encouraging inventions in this sphere was the American Philosophical Society located at Philadelphia. The society offered premiums in 1800 to inventors who could discover the "cheapest and most effective method of rendering Common Oil fit to be burned in the Argand lamp either by purifying the oil or by improvement in the lamp." A premium was also offered for "any simple and effectual methods of rendering turpentine or any other cheap inflammable substance, a fit fuel for street or house lamps or a proper material for candles."[29]

The use of gas for lighting was brought to the

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[28] James Mease, The Picture of Philadelphia (Philadelphia: T. Kite, 1811), p. 124.

[29] "Early Proceedings of the American Philosophical Society for the Promotion of Useful Knowledge . . . Manuscript Minutes of its Meetings from 1744 to 1838." Transactions of the American Philosophical Society (Philadelphia: McCall and Stavely, 1884), vol. XXII, p. 306.

attention of Americans at this time by an Italian company of fireworks manufacturers who combined the sale of fireworks with circus performances. They announced in 1796 during a visit to Philadelphia that their company would provide a "grand firework by means of light composed of inflammable gas." The pipes used to contain the flow of gas were bent and shaped to form figures, emblems and even a country scene. Gas escaping from perforations in the pipes was ignited to produce a spectacular effect.[30]

The next demonstration of gas light was the work of an unusual Englishman, Benjamin Henfrey, in 1802. According to a booklet written by Henfrey in 1797, he had come to America for the purpose of forming a mining company to exploit the large reserves of mineral wealth lying unused in this country.[31] His experiments with gas lighting may have had as one of their purposes the finding of a profitable use for American coal deposits since Henfrey's gas making process was based on the distillation of coal. He traveled to various areas of the United States along the eastern seaboard, making, as he put it, "discoveries in the

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[30] J. Thomas Scharf and Thompson Westcott, History of Philadelphia, 1609-1884, 3 vols. (Philadelphia: L.H. Everts & Co., 1884), vol. I, p. 486.

[31] A Plan With Proposals For Forming A Company To Work Mines in the United States (Philadelphia: Snowden and McCorkle, 1797), p. v.

mineral kingdom."[32]

While in Pennsylvania about 1800, Henfrey met several Americans who were interested in the process of gas lighting which was beginning to be discussed in learned and scientific circles in Philadelphia. Henfrey revealed a plan to visit American cities for the purpose of inducing them to adopt a scheme of lighting based on the use of a "thermo lamp," a term which suggests that Henfrey was acquainted with the work of the French inventor, Lebon. He journeyed to Baltimore attracted by rumors of large unexplored coal fields in the vicinity and while there sought to interest the municipal authorities in his proposal to light the city with coal gas.[33]

In the plan he proposed to the Mayor and City Council of Baltimore in the spring of 1802, Henfrey would have used tall towers with strong lights acting as beacons which would serve to illuminate the surrounding areas. Thus he would have substituted for street lamps "one or more Light Houses to be lighted by means of a certain inflammable gas, with reflectors for increasing and extending the rays of light." The practicality of this scheme seems not to have been satisfactorily demonstrated and the plan was rejected.

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[32] Ibid.

[33] Thomas Cooper, Some Information Concerning Gas Lights (Philadelphia: John Conrad and Co., 1816), p. iii.

Next, Henfrey sought to interest a group of private citizens in the possibility of using gas for lighting and warming rooms but once again he was unsuccessful.[34] After leaving Baltimore, Henfrey arrived in Richmond, Virginia in the summer of 1802. There he gave an exhibition of his "New Light" at the Hay Market Garden, a prominent pleasure resort of the day. The admission charge was 50 cents. Henfrey used a tea kettle to produce illuminating gas from wood and pit coal. The spectators found the demonstration amusing but refused to take the experiment seriously. Henfrey arranged for a visit by a committee of prominent citizens who later issued a report stating their belief that the "New Light" could be used advantageously for lighting houses, octagon light-houses, manufactures and domestic uses."[35]

The Richmond press attacked Henfrey as a fraud but he was successful in raising enough money by public subscriptions to build a 40 - foot tower of wood at a high point on Main Street. A small building near the foot of the tower contained the gas-making apparatus, and a pipe conducted the gas from the building to the top of tower and then into a large lantern containing many gas jets. When lit, Henfrey's

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[34] Scharf and Westcott, History of Philadelphia, p. 500.

[35] Christian W. Asbury, Richmond: Her Past and Present (Richmond, Virginia: L. H. Jenkins, 1912), p. 55.

beacon gave off a bright light which illuminated the town. Large crowds came at first to view the light, but as time went on enthusiasm lessened. The tower was soon abandoned and Richmond reverted to the use of lamp posts lit by oil.[36] Henfrey returned to Pennsylvania seeking new support for his scheme to light cities by means of inflammable gas.

In February of 1803 a farmer was brutally murdered by a group of thugs in a darkened area of the city of Philadelphia. The aroused citizens presented a petition to the Council proposing the provision of more light to prevent the repetition of such a crime. This prompted Henfrey to issue a public address to the Council stating that his system of extracting gas from coal was "applicable to lighthouses for the sea and an octagon lighthouse for the use of towns." He promised great economy of operation claiming that the coal used would be of more value after the gas and tar are extracted, than it had been before.[37]

The plan he proposed for lighting Philadelphia was similar to that used in Richmond. Towers were to be erected in certain parts of the city so that their lights cast from a great height would serve to illuminate entire areas of streets and alleys. In order to convince the authorities of

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[36] Samuel Mordecai, Richmond in By-Gone Days: Being Reminiscences of an Old Citizen (Richmond: George M. West, 1856), pp. 303-304.

[37] Scharf and Westcott, History of Philadelphia, p.514.

the soundness of his plan, Henfrey offered testimonials signed by the citizens of Richmond. Public opposition was so strong, however, that no attempt was made to give the inventor's proposals a trial. Discouraged, Henfrey gave up all further attempts to promote gas lighting.[38] The events of 1802 were significant in that they occurred at least eight years before the successful establishment of the first English gas lighting company and fourteen years before the organization of the first American company. Furthermore, Henfrey had clearly attempted to tie in the development of gas lighting with the development of America's vast unused coal reserves thus anticipating an important factor in American industrial growth by many years. Unfortunately, the plan for the use of gas light was based on an inadequate technological base and failed to convince the public authorities that it represented a practical alternative to the oil lamp.

In 1805, David Melville, a pewterer and proprietor of a hardware store in Newport, Rhode Island, conducted experiments with gas.[39] Melville used gas to illuminate his house and the street in front. The gas-making apparatus was set up in the basement of Melville's home and produced a gas

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[38] Ibid.

[39] Dictionary of American Biography, s.v. "Melville, David."

flame which lit up an entire block. The public was invited to visit the Melville home and to inspect the gas-making plant.[40]

Melville secured a government patent for his "invention" in 1810 and another for improvements on the original apparatus in 1812.[41] Thomas Cooper, the foremost authority on gas lighting in the United States at this time, viewed Melville's claims with scorn. Cooper regarded Melville's gas apparatus as an inferior copy of English patents. The taking out of patent rights, he declared, had become a "most disgraceful and demoralizing speculation."[42]

Melville, nevertheless, was able to inspire enough confidence in his process so that Winslow Lewis, a sea captain and hydraulic engineer, undertook to join Melville and provided financial support for a scheme to construct and install gas-making apparatus for private use. On February 20, 1813, an advertisement in the Newport _Mercury_ announced an exhibition of gas lighting on Monday and Tuesday evenings and open to the public for an admission charge of 25 cents. The "Bathing House" and several adjoining apartments were to be lighted and the public was informed that someone

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[40] Edith May Tilley, "David Melville and His Early Experiments with Gas in Newport," _Bulletin of the Newport Historical Society_, no. 60 (January, 1927), p. 3.

[41] _Ibid_.

[42] Cooper, _Gas Lights_, p. 59.

would be present to answer any questions concerning gas lighting.[43] A second announcement in the same paper during the following week invited "gentlemen concerned in manufactories" to view the gas lights in order to judge their superiority as a form of lighting. Assurances were given to interested businessmen that, "The gas apparatus is very simple in its construction and so easy in its management, that any person of ordinary faculties may be taught in one day to manage every part of it effectually and that the trouble will be found infinitely less than that of trimming and tending lamps to afford the same number of flames."[44] The exhibition was widely attended by people who came from surrounding communities and states. Several New England manufacturers were persuaded to try the new gas light. Gas making apparatus was ordered from Melville for the large cotton mill of Seth Bemis at Watertown, Massachusetts, and for two companies at Providence, Rhode Island: DeWolfe's Arkwright factory and the Wenscott Manufacturing Company. By the fall of 1813, gas-lighting systems had been installed under Melville's direction.[45]

Despite this promising beginning, Melville's gas

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[43] Tilley, "David Melville," p. 4.

[44] Ibid., p. 5.

[45] "The Pioneer of Gas Lighting in America," American Gas-Light Journal, I (November 1, 1859), 88.

business ran into serious difficulties. A workman at De Wolfe's Arkwright factory entered the gas house with a lighted candle and immediately caused a large explosion which destroyed the gas house and killed the man. Fears and prejudices against gas began to grow as a result of this and similar incidents. A letter from the Wenscott Manufacturing Company in December, 1813 complained that the gas pipes leading from the condenser to the cistern were clogged with "tar," blocking the passage of the gas and hindering the operation of the gas lights. The company also stated that the gasometer contained only enough gas for two hours' consumption instead of the three hours originally promised.[46] The costs involved in supplying gas light by means of Melville's system turned out to be much greater than he had anticipated. His original proposal had been "$10 per light . . . exclusive of the cost of transportation and the erection of the gasometer house and the cistern." By November, 1813, the cost had risen to $12 and $13 per light.[47] In addition, Winslow Lewis, Melville's financial supporter, began to have doubts about the way the business was progressing and refused to

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[46] Ibid.

[47] This amounted to a monthly rental charge while equipment was in use. This point is not made explicit in the literature but it would seem from subsidiary comments that Melville was responsible for maintenance and replacement of gas plants constructed by him, even though the operation of the apparatus took place on the consumer's premises.

supply additional and badly needed capital.

Melville's business fell off sharply but he managed to retain some hope for the future and continued to work to improve his original apparatus. In 1815 we find Melville's name linked with that of Osborne Parsons. Both men applied for a government patent for a new improvement in the application of "Carburetted Hydrogen Gas." The inventors planned to make gas light portable by using an air pump to force gas into a "portable gas meter" which could then be transported any distance and used for lighting private homes and factories.[48] The patent was secured on September 13, 1815,[49] thus giving the Americans priority over a similar English process developed in 1819 but the manufacture of portable gas-meters was apparently never commenced.

Melville's fortunes took a turn for the better when he received a contract from the United States government to use gas on a trial basis for one year in lighting the Beaver Tail Lighthouse in order to decide on the advisability of substituting gas for older methods of lighting. He gave himself over completely to conducting the experiment. Two sets of gas-making apparatus were erected in order to provide continuous lighting, should one set need cleaning. The gas was distilled from tar and rosin, American products which were

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[48] "The Pioneer of Gas Lighting," p. 88.

[49] Ibid.

always obtainable, rather than from English coals. Melville lived at the lighthouse along with the keeper and his son and kept a diary recording daily operations and expenses. By October 1818 the experiment had been concluded and Melville submitted his report to the Secretary of the Treasury. The latter, after examing this report, declared himself completely satisfied with the results and promptly paid all bills submitted. However, the government declined adoption of gas light because of the opposition of those who were under contract to supply whale oil and from those engaged in the whaling industry.[50] Melville was told that although the adoption of gas light must be put off for the moment, it would doubtless be of value in time of war when access to whale oil might be curtailed. No further attempts were made by the discouraged inventor to promote the use of gas. He died in 1856 three years after the introduction of gas lighting into the Town of Newport where he spent the last years of his life.

It is to the Peale family of Philadelphia that we are indebted for the establishment of the first permanent and successful gas lighting company in America. Charles Wilson Peale, a distinguished American portrait painter with a strong interest in the sciences, had opened a museum in Philadelphia after the Revolutionary War. His aim was to

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[50] Tilley, "David Melville," p. 14.

display objects and things "calculated to delight the mind and enlarge the understanding."[51] The museum was a financial success and provided a means of livelihood for the painter when the demand for art was low. Peale had five sons who aided in its operation. In 1816 the museum, located in the old Philadelphia State House, was under the direction of the oldest son, Rubens, who had been conducting experiments for some years past with the production of illuminating gas. At the suggestion of Dr. Benjamin Kugler, a Philadelphia physician and friend of the Peales , Rubens made plans for the use of gas lighting as a device which would not only illuminate the museum's exhibits but which would also afford a novelty to attract visitors and aid in sustaining the museum financially.[52]

Early in 1816, the apparatus for the production of gas was installed under a flight of wooden stairs in a large closet in the middle of the museum. The first attempt to provide gas light was disastrous. Each time the retorts were opened for replenishment by coal, an unpleasant and overpowering odor invaded the museum halls. The wooden stairs presented a fire hazard and leaking pipes increased

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[51] The Story of America's Oldest Museum Building (Baltimore: The Peale Museum, 1962), p. 2.

[52] Charles Coleman Sellers, Charles Wilson Peale, vol.II, Later Life, 1790-1827 (Philadelphia: American Philosophical Society, 1947), p. 301.

the danger of explosion.

Dr. Kugler was called in for advice and under his guidance several important improvements were made. The gas plant was moved to a room in the steeple out of sight of the public. Tar was substituted for coal and this meant, presumably, that the prevalence of unpleasant odors was minimized or eliminated since it was no longer necessary to open the retort doors. Tar was fed continuously and left no residue. William Henry, a coppersmith, was called in to repair the pipes so as to prevent leaks. In addition to performing the tasks he was paid for, it is interesting to note that Henry became so familiar with the process of gas production during his labors that he was able, some months later to invite the Philadelphia Common Council to his home to witness a demonstration of gas lighting by means of a process which he declared himself ready to use for the supply of gas to the city of Philadelphia.[53]

The changes instituted by Rubens Peale were successful. A month after the first attempt, the public was pleased to find on visiting the museum the halls and exhibits lighted by bright and odorless flame. As word of the new light spread, museum attendance reached a new high, and, by the end of 1816, the museum records showed an income that was large enough to pay the expenses incurred by the installation of

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[53] Ibid., p. 302.

gas and still produce a profit substantially greater than that of previous years.

Rembrandt Peale, another of the Peale sons, who operated a museum in Baltimore, had been keeping in close touch with events at Philadelphia. Hoping to achieve a similar success, Rembrandt prevailed upon Rubens and Dr. Kugler to assist him in setting up a gas-making apparatus in Baltimore. Dr. Kugler journeyed to Baltimore, as did some of the workmen who had been employed to assist Rubens in Philadelphia. With their help, a small gas plant was installed in the Baltimore museum.[54]

On the evening of June 11, 1816, visitors to the museum witnessed the first use of gas light in their city. The small gas plant, located in and about a fireplace in a room on the first floor, contained, in embryo, all of the elements needed to produce illuminating gas. A small tank acted as a gasometer (gas holder) and opened into a flexible hose which rose to the ceiling where it was attached to a circular pipe. This crude chandelier contained 50 perforations on its upper surface to which gas jets were attached. A turn of a valve allowed one to flood the room with gas light.[55] The press announced on the following day that the

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[54] Ibid.

[55] Peale's original gas apparatus is on display in the Peale Museum at Baltimore along with the works of art by this gifted American. Wilbur Harvey Hunter, director of the museum, and his staff take great pride in this historic exhibit of 19th century gas lighting.

effect produced by gas light far exceeded the expectations of those present. "We are much pleased to find that the illumination by Gas will be continued every evening for some time . . . each citizen may have an opportunity of being convinced how much superior it is to every other kind of light."[56]

With the success of gas lighting assured, Rembrandt Peale and an associate invited a group of wealthy Baltimoreans to join them in the promotion of a company to supply gas light for the city of Baltimore. The group who were eventually to become the directors of the proposed gas company included, besides Peale, a newspaper editor, a wealthy merchant, a bank president and an architect.[57] They sought out the Mayor to ask approval of their plan. A special meeting of the City Council was promptly called and committees from each branch of the Council were appointed to inspect Peale's gas light apparatus and render a judgement. Within a matter of days, the City Council heard its committees recommend adoption of the plan to form the Baltimore Gas Light Company. Ordinance Number 28 was passed to provide for the more effective lighting of the streets of Baltimore and to outline the

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[56] Federal Gazette and Daily Advertiser (Baltimore), June 12, 1816, as quoted in Thomson King, Consolidated of Baltimore, 1816-1950: A History of Consolidated Gas, Electric Light and Power Company of Baltimore (Baltimore: Published by the Company, 1950), p. 13.

[57] King, Consolidated of Baltimore, pp. 18-20.

rules and regulations the new company was bound to follow.[58] It had taken less than a week to establish the first gas lighting company in the United States. Baltimore's historic street lighting law provided that the use of gas light was to be adopted without any increase in the expenses of street lighting (as measured by the use of oil). The company was given permission to lay pipes in public streets and squares but was held responsible for filling up all holes that had been dug and for the carting away of any rubbish remaining within 48 hours. Failure to comply with this provision was to be punished by a fine of $20 with an additional $5 for each day the neglect continued. The Mayor was given the power to contract with the company for the lighting of a street or parts of streets on reasonable terms. All contracts were good for only one year but might be renewed. The company, in the meantime, was free to sell its gas light for private use.

Two months later, in September, 1816, the company began the construction of a gas house at the southwest corner of North (now Guilford) and Saratoga streets. The laying of pipes through the city was begun but the work was considerably delayed by the difficulty of breaking the frozen ground. On February 7, 1817, by using that portion of the

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[58] Ordinances of the Corporation of the City of Baltimore: From 1813 to 1822, Inclusive (Baltimore, 1828), p. 90.

pipes already connected, the first gas street lamp in Baltimore was lighted (at the site of the present Baltimore and Holliday streets).

In the meantime, the directors had applied to the Maryland Assembly for a charter of incorporation which they received on February 5, 1817.[59] The state document created a corporate body which could issue stock for the raising of capital and also defined the limits within which the company was to function. It was forbidden to possess real or personal estate above the value of one million dollars, nor could stock be issued with a par value greater than $100,000. One hundred shares of the stock issued was to be assigned to Rembrandt Peale as compensation for giving up to the company the patent placed in his hands by Dr. Kugler and which the company proposed to use in the manufacture of gas. The state, recognizing the existence of the municipal ordinance, included the privileges and restrictions of that document within the charter of incorporation. A final paragraph spelled out the doctrine of limited liability for the protection of stockholders and investors. By proceeding in this fashion, the Baltimore company followed the practice of the Gas Light and Coke Company of London which had organized itself into an active company before seeking and receiving a charter of incorporation from the British Parliament.

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[59] Laws of the State of Maryland, 1816, chap. 251.

The progress of the new company, however, was so slow that in 1820, several years after the lighting of the first street lamp, there were only three private consumers. The main difficulty facing the Baltimore company concerned the nature of the gas-making process they had decided to use. Dr. Kugler's technique of producing gas by the distillation of tar proved unsatisfactory for large scale production. In 1822, after years of trying, the company gave up the use of tar and turned to coal. Another problem related to the company's failure to devise an effective system for having the consumer pay for the gas actually used. The practice at first was to set a flat rate per burner. The rate was calculated to cover the cost of gas it was estimated would be used by the consumer. This gave the consumer little incentive to economize, and he often burnt gas beyond the prescribed hours using a flame of more than the recommended three inches in height.[60]

The depression of 1818-21 further checked the progress of the company by lessening the prospects for the use of gas light. Despite this and other difficulties, the number of private consumers had risen to 73 by the end of 1821 and the company's income for that year amounted to $8,000, of which $3,000 represented the revenue derived from the supply of gas to the public lamps. The vast majority of

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[60] King, Consolidated of Baltimore, p. 38.

private consumers were merchants who used gas for the illumination of stores and businesses.[61] The first dividend to its stockholders was declared in 1827 and growing stability may be seen in the fact that beginning in 1828 a regular quarterly dividend of $2.00 was announced (only to be discontinued temporarily several years later due to financial difficulties). The company prospered and eventually entered into a series of mergers and consolidations culminating in the present Consolidated Gas Electric Light and Power Company of Baltimore.[62]

With the opening of the decade of the 1820's gas lighting, as one author put it, was first beginning to stand on solid ground. In 1820, an important technical advance had been made by J.B. Neilsen of the Glasgow Gas Works, the development of the "fish tail" burner. By placing two gas jets alongside one another and inclining them so that their flames struck one another, the resultant flame fanned out into a broad surface flame of high luminosity. The dramatic improvement in the quality of gas light brought about by Neilsen's discovery did much to gain for gas light greater

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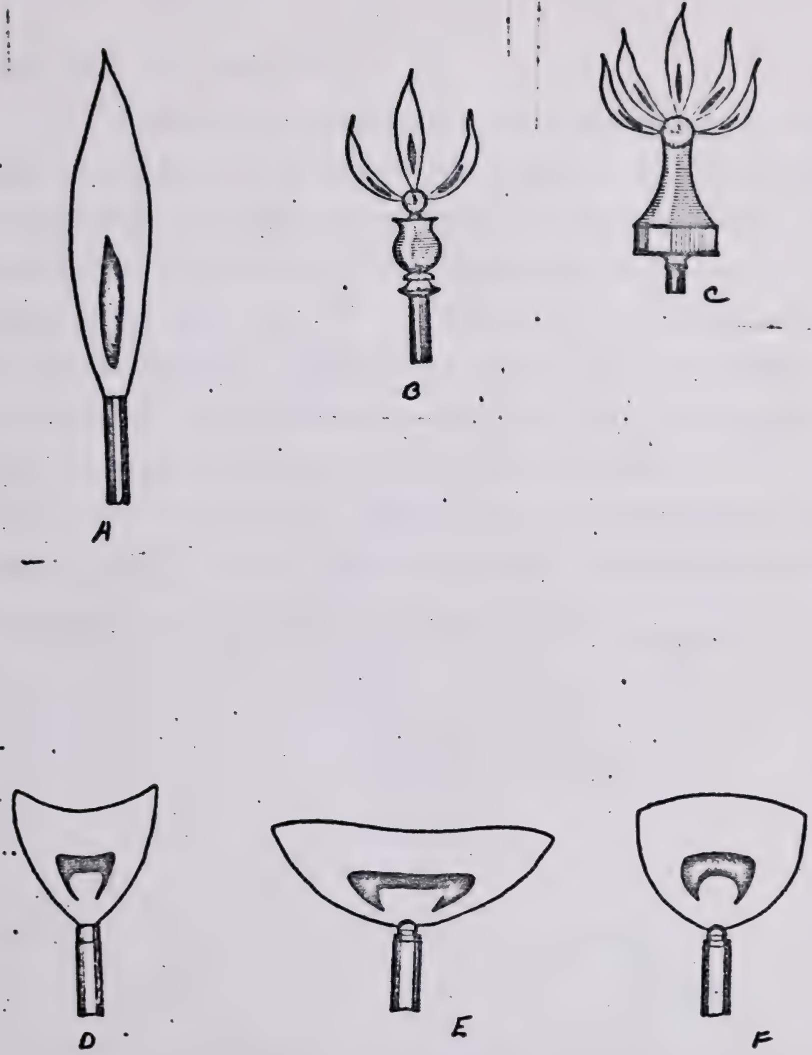
[61] *Ibid.*, pp. 32-33.

[62] Edwin F. Reich, MS, untitled, in the files of the Maryland Room of the Enoch Pratt Free Library, Baltimore, Maryland. See also, King, *Consolidated of Baltimore*, plate facing p. 1.



A–The Open Jet

B and C–Cockspur Burners

D–The Fish-tail Burner

E and F–Bats-wing Burners

Figure 2 Open Flame Burners

favor with the public.[63]

In addition to Baltimore, gas light companies were established in this decade in the cities of Boston, New York, and Brooklyn. In 1820 Frederick Winsor introduced gas illumination in Paris, and by 1823, there were 23 cities in Europe using gas light.[64] The formation of the New York Gas Light Company in 1823 opened a new era in the history of gas lighting in the United States. The New York company's rapid progress was accompanied by the solution of the technical problems which had plagued the Baltimore company and opened the way for the expansion of gas lighting throughout the country.

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[63] William Ressman Andrews, "One Hundred Years of Gas Lighting," Scientific American, vol. CXXIII (Nov. 27, 1920), p. 544.

[64] Ibid.

CHAPTER IV

NEW YORK CITY EXPERIMENTS WITH GAS

By 1810 New York was truly a "city on the march,"[1] marching in all directions at once, growing rapidly in population, expanding her trade and commerce and erecting new buildings at an astonishing rate.

Between 1790 and 1800 the population had increased from 33,000 to 60,000 people, a rate of 82 per cent for the decade. A lesser but still impressive growth took place between 1800 and 1810. Population rose from 60,000 to 96,000, a rate of increase of 55 per cent.[2] New York, which had lagged behind Philadelphia during the eighteenth century, became in the early years of the nineteenth the most populous city of the new nation. This period saw also the rise of New York as the great commercial and trading center of the United States as the value of its imports and exports exceeded

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[1] Martha Lamb, History of the City of New York: Its Origin, Rise and Progress, vol. II (New York: A.S. Barnes and Company, 1877), p. 569.

[2] Census of the State of New York for 1855;...Prepared from the Original Returns...by Franklin B. Hough (Albany, 1857), p. xxxiv.

that of Philadelphia and all other cities.[3] Even before the advent of the Erie Canal, the city's future greatness had become visible.

The physical boundaries of the city were expanding rapidly. New York had been divided into six wards by the Charter of 1686. As population grew in the northern wards, the city extended its boundaries. A seventh ward was added in 1791 and boundaries were extended in 1797. By 1808 the city was divided into ten wards and the city was now extended on its western side as far north as the present site of Canal Street, and on its eastern side as far north as the present site of Broome Street. An extension of boundaries in 1817 nearly doubled the size of New York. The northwestern boundary ran along part of the present Greenwich Avenue, the northeastern boundary, the present Houston Street. Growth of the city's perimeter in two decades (1797-1817) had dwarfed the progress made in the previous century.[4]

The most far reaching of all changes which occurred was brought about by the decision of city and state officials in 1807 to adopt a gridiron pattern for the lands north of Canal Street. Three commissioners were appointed

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[3] Robert Greenlagh Albion, The Rise of New York Port, 1815-1860 (New York: Charles Scribner's Sons, 1939), p. 8.

[4] John Disturnell, New York As It Was and As It Is (New York: D. Van Nostrand, 1876), p. 78.

to map out a plan for the future expansion of the city. In accordance with the views of city growth then coming into vogue, a system of streets and avenues laid out in squares and rectangles was adopted in 1811. Thereafter the work of transformation was begun in earnest. The hilly island was flattened as hills and valleys disappeared before the pick and shovel. "All that was romantic in scenery and prepossessing in cultivated grounds immediately above Canal Street was quickly doomed. . . . The valley of Canal Street at its foot had been transformed into a busy thoroughfare, no longer presenting a pastoral picture with streams of water flowing through it into both rivers."[5]

Travellers returning to the city after some years absence were quick to remark on the changes. One such account written in 1800 declared:

> When I left London the common topic of coversation respecting America was the great improvement in the extent and prosperity of the city of New York. . . . The shipping of the port increases faster than we produce docks. . . . All the principal streets are handsomely paved. . . . In 1790 few besides old houses were to be seen. They are now almost obscured by new ones.[6]

A letter in the press of 1803 exclaimed: "Our improvements are now extending with a rapidity that defies

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[5] Lamb, History of New York, pp. 566-569.

[6] Stokes, Iconography, V, 1384.

all calculation."[7]

In 1810, the Columbian stated:

> At no period for a number of years past, have the citizens of New York witnessed such numerous and extensive evidences of the increases of wealth and prosperity as at the present. At no time have we seen so many improvements in the streets and buildings progressing. Almost every street in the city is lumbered with rubbish of old and wooden houses pulled down to make room for more permanent and valuable edifices of brick.[8]

In response to this dynamic growth, the city government began to assume a metropolitan cast. The Common Council appointed "commissioners" and created departments to handle problems that were becoming too complex to be handled by the Boards of Aldermen and Assistant Aldermen *en camera*.[9] A Commissioner of Police was appointed in 1801.[10] The office of Comptroller was established in 1802 and the first printed report of this office may be found in the minutes of the Common Council for 1808.[11] A Superintendent of Scavengers

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[7] *Ibid.*, p. 1401.

[8] *Ibid.*, p. 1520.

[9] The grouping of functions and the process of departmentalization of the city government has been described as a measure of urbanization. See Ernest Stacey Griffith, *History of American City Government: The Colonial Period* (New York: Oxford University Press, 1938), p. 419.

[10] Thelma E. Smith, *Guide to the Municipal Government of the City of New York*, 9th ed. (New York: Meilen Press, Inc., 1966), p. 226.

[11] *Ibid.*, p. 55.

was appointed in 1803 to deal with the health hazards posed by uncared for vacant lots within the city and to exercise some control over the cleaning of the city's streets and grounds.[12]

The major source of water for the city's inhabitants during this period was the private and public pumps and wells. The dumping of waste matter in the nearest pond or stream (and in the streets as well) and the existence of thousands of privies had contaminated and fouled the water supply. A private company, the Manhattan Company, was chartered in 1799 to provide "pure and wholesome" water to the city's inhabitants. Thus did New York begin its experiment with the provision of vital public services by private companies, although, as we shall see, any optimism based on the Manhattan Company's prospectus turned out to be premature.[13]

Similarly, the organization of municipal lighting services underwent change and refinement. The Council's Lamp Committee was kept busy studying the city's lighting system and the possibility of its improvement by a number of devices. In January, 1806, the Lamp Committee was directed "to try the Experiment of reflecting Lamps suspended in the

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[12] Ibid., p. 53.

[13] Nelson Manfred Blake, Water For the Cities: A History of the Urban Water Supply Problem in the United States (Syracuse: Syracuse University Press, 1956), chap. III.

middle of Streets, and also to examine the practicability of lighting the City by Furnaces."[14] In May of the same year, the Council decided to try the use of private contractors for lighting the city lamps, and the proposal of Jacob Cholwell offering to perform the task at the rate of $11 per lamp was considered to be the lowest bid.[15] A year later a contract with Cholwell was actually put into effect at the rate of $10 per lamp for which rate the City would be guaranteed that the contractor would "find Oil, wick, etc. and light all the City Lamps, including the signal lamps . . . the signal lamps to be lighted every night at the same price, and all other lamps to be lighted the third, second and first nights next after the full of the moon whenever necessary."[16]

In the spring of 1810, the Common Council expressed its view that "some improvement in lighting the populous city is of great importance" and empowered Alexander Andrews to import 900 burners and reflectors of a new type for trial in the city lamps.[17]

A month later, the Lamp Committee devised a new experiment to improve lighting conditions. It divided the

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[14] NYMCC, 1784-1831, IV, 121.

[15] Ibid., p. 193.

[16] Ibid., p. 482.

[17] Ibid., VI, 115-116.

Lamp and Watch district covering most of the city into two divisions, an eastern and a Western one. The city would retain, under its own control, the Eastern Division and let out for public contract the Western Division. This would be a controlled experiment to check the efficiency of municipal lighting.[18] However, this dual scheme of public and private lighting districts fell through. The private contractor hired for the Western Division was none other than Alexander Andrews, importer of the new type lamps mentioned above. He found himself in dispute over the compensation to be offered and withdrew from all further contacts with the Council in regard to lighting activities.[19] The Lamp Committee was forced to resume operation of both the eastern and western sectors of the Lamps and Watch District.

The council struggled for the next several years with the problems of obtaining adequate supplies of oil for the city lamps, satisfying the requests of citizens for additional lights and supervising the forces assigned to maintain the public street lights. The first sign that a new order might be approaching was a communication of February 19, 1812, which appeared in the Columbian:

> A petition to the legislature is now handling about the city (rather secretly) to obtain for the benefit of a few individuals and to the injury of the manufacturing interests of the state, an exclusive privilege for lighting cities and manufactories

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[18] Ibid., p. 228.

[19] Ibid., p. 295.

> with gas for 14 years. . . . It is to be hoped the legislature will be on the alert, and not to grant an exclusive right to what has been long known in Europe, and used with great benefit, in most large establishments for manufacture in England.[20]

There is no further word of this petition or of the individuals promoting it. Opposition to the petition seems to have been directed less at the idea of gas lighting than at the implication that a state charter might be granted which would keep others from trying similar schemes. Experience had shown that the legislature was reluctant or refused to grant charter privileges in areas where incorporated companies were already established. Despite the failure to establish an American company on a solid basis, there was enough knowledge here of English gas lighting developments to cause resentment of any attempts at monopoly. This is probably the best explanation of the Watch and Lamp Committee's refusal in 1813 to adopt a proposal to use gas instead of oil for the city lamps. Messrs. Ward and Tallman had invited the committee to an exhibition of gas lights in City Hall Park. The committee was convinced of the superiority of gas over oil but did not recommend adoption of gas because the "propositions made by Messrs. Ward and Tallman are such as your committee deem inexpedient for this board to accept."[21]

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[20] Stokes, Iconography, V, 1540.

[21] NYMCC, 1784-1831, VII, 542.

The committee recommended that since the lighting of lamps by gas was not a secret confined to Ward and Tallman, the committee should be empowered to conduct its own experiment by causing the lamps in front of City Hall or in some other place to be lighted by gas.[22]

A few months later the council accepted an invitation to view an exhibition of gas light conducted by Ephraim Gennings in front of the Bridewell prison at night.[23] Gennings, a former Superintendent of Lamps, seems to have had little success with his demonstration as no further mention is made of it in the council minutes.

In 1815, the Common Council reorganized its standing committees and made appointments to its newly formed Committee of Arts and Sciences.[24] As was stated some time later in connection with a gas lighting proposal, "the Common Council are bound to foster the arts and sciences and to give encouragement to useful inventions."[25] The new committee would serve such a purpose by providing inventors with opportunities to be heard in detail regarding their proposed inventions. During the course of its existence, the committee was called upon to consider the merits of a perpetual motion machine, standards for the regulation of steamboat boilers, a scale for measuring firewood, a chimney sweeping machine

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[22] Ibid.

[23] Ibid., p. 561.

[24] Ibid., VIII, p. 370.

[25] Ibid., p. 557.

and the numerous proposals for the introduction of gas light.[26]

The year 1816 seems to have been an unusually active one in this respect. At least five communications or memorials concerning gas lighting were received by the Common Council during the first half of the year. These were promptly forwarded to the Committee on Arts and Sciences, whose members examined each proposal, conferred with the inventor and issued a detailed report of their findings on June 18, 1816.[27]

The committee report was a highly educational one for the members of the Common Council, since it provided a comprehensive discussion of the state of gas lighting in 1816 and a simplified explanation of basic principles involved. The first paragraph contained the flavor:

> Gaslights otherways called the Thermo Lamp is produced by the combustion of inflammable air. This air may be obtained from various sources, but for economical purposes it has been principally procured from wood or coal—coal on account of its abundance and cheapness has been wholly employed in Great Britain to procure the inflammable gas. By Distillation Coal affords beside Gas or inflammable air for burning Coke for an essential oil and an ammoniacal

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[26] David Maydole Matteson, ed., Minutes of the Common Council of the City of New York: Analytical Index, 2 vols. (New York, 1930), s.v. "Arts and Sciences, standing committee."

[27] NYMCC, 1784-1831, VIII, 553-557.

> liquor. Wood submitted to the same process is converted into Gas — Charcoal — for an essential oil and Vinegar. The application of these products to useful purposes in the arts, renders the expense of Gas light trifling in comparison with other lights.[28]

The report sketched briefly the introduction of gas lighting into Great Britain and paid tribute to Lebon, the French inventor, who used gas lights for "economical purposes long before it was publickly introduced into England."[29] American inventors were also mentioned as was Peale's museum in Philadelphia (but not Rembrandt Peale's museum in Baltimore), and among the applicants and inventors before the Committee, special tribute was paid to John Griscom, Charles G. Foster and Robert Hare, as individuals who were making efforts to "call the attention of the public in our Country to this branch of political economy."[30] The Committee recognized that the initial cost of erecting a gas works, laying the pipes, obtaining the fixtures, etc. would be considerable but in view of the efficiency of gas (the committee estimated that gas could supply an equivalent light at one third the cost of tallow), the original expenditures would be quickly regained.[31] The problem of cost seemed to be a critical one. While the superiority of gas as an illuminant was recognized, there was little disposition on the

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[28] Ibid., p. 553.

[29] Ibid., p. 554.

[30] Ibid.

[31] Ibid., p. 555.

part of the council to adopt gas lighting unless it could be clearly demonstrated that it promised to lessen the public expense incurred by lighting the streets with oil.

This question was a difficult one to resolve. Reports from Europe, the committee declared, were encouraging. An incorporated company in London had been bound by its charter to "furnish a better and stronger light than oil at less expense" and had been able to do so while making a profit. "Everyone who made use of this method of illuminating in Europe has found its economy surpasses all expectation.[32] Yet there were doubts as to whether the same profit was possible in New York. The higher prices paid for labor, wood and coal on this side of the Atlantic would diminish profit and it was uncertain that coke and other by-products of distillation could be so readily disposed of as in Great Britain. The sale of by-products in that country was an important factor in reducing costs.[33]

During the course of its hearings, the Committee on Arts and Sciences had been told that the cost of erecting 600 gas lamps would be $2,400 and that an additional $640,000 was needed for gas-making apparatus and gas mains. These figures, exclusive of the cost of the supply of gas, were deemed prohibitive. However, a plan for a less complicated process of gas manufacture was brought to the committee's

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[32] *Ibid.*, p. 556. [33] *Ibid.*

attention by the Philadelphian scientist, Dr. Robert Hare. The latter advocated the distillation of pitch rather than coal and estimated the cost for "outfit" (fixed plant) at $3,300 and the cost of supplying gas at $2,700 which estimates were of course substantially lower than previous ones. Hope was also expressed that by-products sale and other sources of income (not fully explained) would yield $5,100 which would result in a net gain to the city of $2,400 per year while enjoying the benefits of using gas in the public lamps. The committee therefore recommended the appointment of a select committee to institute an experiment using gas light under the supervision of Dr. Hare,[34] and that a sum not exceeding $5,000 be placed at the disposal of the select committee.[35]

In endorsing the recommendations of the Committee on Arts and Sciences, the council presumably hoped to resolve

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[34] Dr. Robert Hare, upon whom the committee chose to place such reliance, was a member of a group of Philadelphians who made many important contributions to the rise of the science of chemistry in America. He was said to have discovered in 1801 the "oxhydrogen blow-pipe," a device which combined the gases of oxygen and hydrogen to give a more intense flame than hitherto had been possible. He was widely recognized at this time as a distinguished American chemist and scientist. See Dictionary of American Biography, s. v., "Robert Hare," also, Edgar F. Smith, Chemistry in America (New York: D. Appleton and Co., 1914), pp. 152-205, and Henry Simpson, The Lives of Eminent Philadelphians (Philadelphia: William Brotherhead, 1859), p. 484.

[35] NYMCC, 1784-1831, VIII, 557.

the conflicting testimony given by inventors and "authorities" on the costs of gas light and the practicality of building a municipal gas works to supply gas for public lamps and for the use of private citizens. A series of experiments toward this end were conducted by Dr. Hare and the Committee on Arts and Sciences in the fall of 1816. A gas works was erected in one of the buildings connected with the old Alms House in City Hall Park. Gas pipes were extended out to Broadway and then down Broadway to the corner of Fulton Street, a distance of about four city blocks. The work proceeded slowly due to the difficulty of obtaining the proper fittings and the skilled labor to construct the works. When completed, the gas supply obtained was used to light several street lamps and shops on Broadway during the course of the experiment.[36]

The experiments were probably completed about the middle of November, 1816; for at that time Dr. Samuel Akerly, an alderman and the chief scientific figure on the Committee of Arts and Sciences, issued an invitation to the Common Council to attend a series of lectures on gas light. The subject of the lectures was to be "Inflammable air and its application to economical purposes"; the lecturer also promised to report on the success of the recent series of experiments conducted by the Committee on Arts and Sciences.[37]

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[36] Ibid., p. 786.

[37] Stokes, Iconography, V, 1588-89.

The official report of the Committee on Arts and Sciences on its gas light experiments was delivered to the Common Council in January, 1817.[38] They expressed their concern lest New York should fail to benefit from "one of the most brilliant inventions of modern times" and be outstripped in an important improvement by her sister cities. Preferably, the entire project should have been undertaken by an individual or private company but "the subject was as yet too little understood and Men of Capital were found unwilling to embark in an untried speculation."[39] The committee recommended, as a result of its experiments, that rosin should be the basic material used in the manufacture of gas. Coal was widely used in England and was said to produce the brightest and most satisfactory light. But there were important objections to its use in this instance. American coal was more expensive than British coal. The coal obtained here contained large quantities of sulphur which produced gas with an offensive odor. To counter this, an elaborate and costly system of purification would be required. This would render the gas usable but would result in the accumulation of foul and fetid wastes and would create a "nuisance" in the neighborhood of the gas works. A London company had been indicted on this account and a trial

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[38] NYMCC, 1784-1831, VIII, 783-790.

[39] Ibid., p. 785.

held. The matter had been settled by passing the objectionable substance into an underground drain which emptied into the River Thames. Rosin, on the other hand, was a substance whose distillation produced a gas requiring little purification. The committee's decision to use rosin gas was probably based on the recommendation of Dr. Hare who, being a Philadelphian, may have been familiar with the achievements of Dr. Benjamin Kugler and the Peale family in producing a rosin gas light in Philadelphia at this time.

After presenting a great many details in regard to the amount of light yielded by rosin gas, the committee arrived at the calculation that the city's street lamps could be operated with gas (assuming they remained on for ten hours a night) for the sum of $20 per year per lamp. Gas light could be supplied to a shop for one half that amount (assuming that each shop required its gas light only five hours per night), or $10 per year. It was estimated that at this rate, there were many shops which would readily buy gas lights.[40]

The committee, however, took the view that the provision of gas was too complicated a venture to warrant having the municipality undertake the responsibility. Dr. Hare's estimates of the cost for a gasworks to light Broadway, Chatham Street, part of the Bowery Road, Maiden Lane and

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[40] Ibid., p. 787.

William Street were $44,000 for the "first expence" or fixed costs, and $44,300 for annual operating costs. Such a gasworks would have the capacity to furnish 40,000 cubic feet of gas per day which Dr. Hare described as sufficient to support 7,300 "flames." These, if paid for at the rate of $10 per year, would produce an income of $73,000 thus enabling the city to realize a net profit on its gas operations of $29,000 per year. Despite these optimistic projections, the committee expressed doubt that a demand for 7,300 flames did exist. It was obvious that a profitable gas enterprise would be possible only if in addition to the city lamps, sizeable numbers of private lamps were to be supplied. This was, of course, outside the scope of the responsibilities which the municipal authorities of that day were willing to assume. The solution seemed to lie in encouraging the formation of a private company by permitting them to lay pipes through the streets and and engaging in a contract with the company to light the public lamps on reasonable terms. The city, it was suggested, could be of further assistance by a pledge to purchase part of any stock issue which a private company might attempt and also by paying for the city's share with land lots suitable for the erection of gas works and other necessary buildings.[41]

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[41] Ibid., pp. 788-89.

In a later era, the critics of large corporations and the special privileges acquired by public utilities were to accuse the city councils of the early nineteenth century of surrendering carelessly the valuable franchises involved in gas, transit, etc.[42] The evidence we have been considering here suggests that the hard headed council of 1817 viewed the choice between public and private operation basically in economic terms. The ultimate grant of a public franchise for gas lighting (in 1823) to a New York company was the result in large degree of the lessons learned in the "school for gas lighting" attended by the Council in 1816 and 1817 and conducted by its own standing committee. Not the least of those who gained from the council's expenditure for "research" were New Yorkers serving at this time on the council or closely associated with it who were later to form the core of the New York Gas Light Company.[43] What is the possibility that the Common Council's reluctance to engage in the production of gas light as a municipal enterprise was merely a ploy designed to divert attention from the desires of some council members to gain a private profit by setting up their own corporation? This is a possibility which

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[42] Gustavus Myers, "History of Public Franchises in New York City," Municipal Affairs, IV (March, 1900), 92; Milo Roy Maltbie, "A Century of Franchise History," Municipal Affairs, IV (March, 1900), 195, 197.

[43] See below, pp.

cannot be overlooked but its validity as an explanation of the events which followed is greatly diminished by the fact that a period of six years elapsed before a gas light company was formed. It should be noted, however, that Dr. Samuel Akerly of the Committee on Arts and Sciences at this time was later to play an important role as a member of the board of directors of New York's first gas lighting company.

The council meeting of January, 1817, which heard the historic report on gas lighting by the Committee on Arts and Sciences was also presented with a petition by Charles Monell, brass founder of New York City, offering to light part of the city with gas and requesting permission to lay pipes in the street for that purpose.[44] Monell planned to use coal for the manufacture of gas and copper pipes for distribution. The estimates for piping in the reports and experiments of the Committee on Arts and Sciences referred to white pine piping. Wooden pipes were then in general use by the Manhattan Company for its water supply. The use of copper pipes was an interesting innovation.

The area proposed to be lighted centered in the streets in the vicinity of what is still known as Chatham Square. The petitioner offered to supply "Inflammable Gas" for lighting the public lamps for a period of seven years at $10 annually for each lamp. The main pipes would carry gas

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[44] NYMCC, 1784-1831, VIII, 778.

through the city in the designated area but the expense of conducting the gas by means of lesser pipes (service pipes) from the mains to the gas lamps was to be borne by the city. The city would be responsible as well for the lighting, extinguishing and the maintaining of the lamps.

In reacting to Monell's petition, the Committee on Arts and Sciences referred to the findings of Hare's experiments and granted Monell permission to use the streets for his project. However, they stipulated that they would retain the right to accept or reject the services offered in regard to the public lamps and that the laying of the pipes and the opening of the streets be under the direction of the Street Commissioner.[45]

No evidence exists that Monell ever exercised the privilege he had been granted, even though a researcher into the Monell family background has claimed that the first public use of gas in New York City dates from the Monell franchise.[46]

Applications by inventors to engage in contracts for lighting the city with gas did not completely cease after the Monell franchise in 1817 but they were much fewer in number. Among the more important of these was the petition of

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[45] Ibid., IX, 15.

[46] Wesley L. Baker to the Consolidated Edison Company of New York, Inc., March 7, 1941. In the files of the company.

Richard Lough who appeared before the Committee on Arts and Sciences on December,1819. After discussion, a revised contract was drawn up and presented to the Council on December 27, 1819. With the comment that it was to be "duly executed" the contract and its inventor lapsed into obscurity.[47] Council records do not show any new proposals for gas light in 1820, 1821, and 1822—a possible consequence of the dislocation suffered in the city during the panic of 1818-1819.[48] Business conditions began to improve in the second half of 1821, and the city's trade and commerce quickened their pace, but in the fall of 1822 the citizens of New York experienced an unusually severe outbreak of what became almost an annual outbreak of yellow fever. Beginning during the late summer, the end of July or August, a few isolated cases acted as a signal to the inhabitants and by September an exodus to the suburbs was in full swing. The setting in of cold weather usually broke the back of the epidemic and the inhabitants of the lifeless city returned in January and February to resume normal patterns of life.[49]

Some time during this period of business reversal and yellow fever epidemic, a group of influential New Yorkers

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[47] NYMCC, 1784-1831, X, 599, 661, 662, 669.

[48] Samuel Reznick, "The Depression of 1819-1822; a Social History," American Historical Review, XXXIX (October 1933), 28-47.

[49] Stokes, Iconography, V, 1623, 1624, 1625.

met together to discuss the formation of a gas light company. They were eventually to become the Board of Directors of the New York Gas Light Company. Their numbers included three merchants, three lawyers, two boat builders, one doctor, one bank president, one plumber and pewterer and two men holding federally appointed posts. Almost all were prominent in the public life of the city and many had held public offices in city or state government. They knew each other personally, some as neighbors, some as business associates. This is reflected in a profile of their backgrounds.

Dr. Samuel Akerly was a prominent New York physician. Assistant Alderman for the Seventh Ward between 1816 and 1819, he was an active force in the Committee on Arts and Sciences especially during the period when it conducted its monumental investigation of gas lighting. Dr. Akerly lectured on gas lighting in Tammany Hall in 1816. His most important work may have been his efforts in behalf of the deaf and "mute" as he preferred to call them. He served as Secretary of the New York Institution for the Deaf and Dumb and was, in fact, in Albany on a legislative mission for this association when the New York Gas Light Company received its charter in 1823. A list of Wealthy Citizens as of 1845 put his wealth at $140,000.[50]

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[50] Matteson, Analytical Index, s.v. "Akerly, Samuel," Moses Yale Beach, Wealth and Biography of the Wealthy Citizens of New York City..., 6th edition (New York: The Sun

Robert Bogardus was a prominent New York lawyer.[51] As Assistant Alderman for the Fourth and Fifth wards between the years 1802-1810, he served on the Lamp Committee. He was commissioned as colonel and given command of the 41st Regiment during the War of 1812. He became an influential backer of the Erie Canal and was listed in Wealthy Citizens in 1845, as possessing wealth of $150,000.[52]

George Buckmaster, a boat builder in 1822, had held various minor posts with city, including fire warden, elections inspector, etc. He served as alderman for the Seventh Ward from 1810 to 1819. As a member of the Watch and Lamp Committee, he voted with the committee in 1813 against the acceptance of proposals to light the city with gas made by Ward and Tallman.[53]

William S. Coe was a wealthy Pearl Street merchant. He had no connection with city government before 1822, but

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Office, 1845) p. 1; Appleton's Cyclopedia of American Biography, ed. by James Grant Wilson and John R. Fiske, vol. I (New York: D. Appleton and Company, 1888), p. 38.

[51] Matteson, Analytical Index, s.v. "Bogardus, Robert"; Stokes, Iconography, VI, 320; Appleton's Cyclopedia, I, 301.

[52] Beach, Wealthy Citizens, p. 4.

[53] Longworth's American Almanac, New York Register and City Directory..., 1822-23 (New York: Thomas Longworth, 1823); Matteson, Analytical Index, s.v. "Buckmaster, George"; NYMCC, 1784-1831, VII, 542.

became extremely active after his involvement with the gas company. He served as assistant alderman and alderman for the Seventh Ward, from 1825 to 1829, being a member of the Lamp Committee in 1826 and 1827. He was unsuccessful as a candidate for mayor in 1830 and 1831. He was listed in Wealthy Citizens (1845) as possessing wealth of $100,000.[54]

Moses Cunningham was listed in the city directory for 1822-23 as "collector." Elected Constable for the Eighth Ward in 1811, he was Justice of the Peace in 1815. In addition he held a series of minor posts as commissioner, notary, custom house officer, etc.[55]

Henry Eckford was the most prominent of the founders of the New York Gas Light Company. Described as a "naval architect," he owned one of the largest shipyards in New York City. His portrait was painted in 1809 by Robert Fulton. During the War of 1812, Eckford gained wide popularity for his feat in constructing the sloop-of-war, "Madison," of twenty-four guns, forty days after her timber had been cut. The sloop was constructed in a primitive shipyard on Lake Erie and fought important battles on the Great Lakes. Prominent literary figures of the day frequented his home in Love Lane, near 21st Street in New York City. He held no

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[54] Matteson, Analytical Index, s.v. "Coe, William S"; Beach, Wealthy Citizens, p. 6.

[55] Matteson, Analytical Index, s.v. "Cunningham, Moses"; Longworth's City Directory, 1823.

posts in city government. He was listed in Wealthy Citizens Biography in 1822 as possessing a taxable wealth of $50,000 in 1820.[56]

Josiah Ogden Hoffman was reputed to be the leading criminal lawyer in the city. He was extremely active in Tammany politics and served at one time as the Grand Schem of Tammany Hall. He served in the State Legislature from 1791 to 1795 and was re-elected in 1797. He was chosen Recorder of the City of New York in 1808 and held this office until 1815. He held important federal positions in later life.[57]

Samuel Leggett was the descendant of a well-known family of Quakers who started out as grocers and eventually made a fortune as jobbers and auctioneers in early nineteenth-century New York. In 1818, a group of wealthy men selected him as president of the newly formed Franklin Bank. During this period and prior to his association with the gas company, he organized a group to solve New York's water supply problem by tapping the Bronx river for the purpose. For unknown reasons the plan was never consummated. Leggett was the guiding light and organizer of the New York Gas Light

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[56] J.H.G. Pierson, "Origins of the Consolidated Gas Company of New York" (MS in the files of the Consolidated Edison Company of New York, Inc., undated), p. 35; National Cyclopedia of American Biography..., vol. I (New York: James T. White and Company, 1898), p. 350.

[57] Wilson, Memorial History, III, 633; National Cyclopedia of American Biography, III, 376.

Company and became President of the Board in 1823. He had not held any important elective post with the city though in an earlier period he had briefly held the minor post of assessor. He was listed in the Wealthy Citizens Biography, 1822, as possessing $50,000 in taxable personal property.[58]

Thomas Morris was listed in the city directory for 1822 as a United States marshal at New York. He held minor city posts for a brief period of time in 1807. He gained prominence during the War of 1812 for his role in helping to build the steam frigate, "Fulton the First."[59]

William Seamen was attorney and notary in Samuel Leggett's bank. He held no important city posts before his association with the gas company in 1823. He served as assistant alderman for the Seventh Ward for the years 1827 to 1831 and played a prominent part in the lighting affairs of the city during that period.[60]

Thomas Smith was a highly respected and influential wholesale and retail grocer in the opening decades of the

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[58] [Joseph Alfred Scoville], The Old Merchants of New York City, by Walter Barrett, clerk [pseud.], 5 vols. (New York: T.R. Knox, 1885), pp. 240-250; Henry Wysham Lanier, A Century of Banking in New York, 1822-1922 (New York: The Gilliss Press, 1922), p. 142; Pierson, "Consolidated Gas," p. 36.

[59] Longworth's City Directory, 1822-23; Matteson, Analytical Index, s.v. "Morris, Thomas"; Stokes, Iconography, VI, 498.

[60] Matteson, Analytical Index, s.v. "Seamen, William"; Pierson, "Consolidated Gas," p.

19th century. His firm was considered one of the three great tea houses in America. During the War of 1812 he bought $10,000 in government bonds to aid in financing the war effort. His business failed in 1827 and he died shortly thereafter owing the government $3,000,000.[61] He held no city posts.

Richard S. Williams was a successful grocer who held no city posts before 1822 and only minor ones thereafter. A tax list of 1823 gives the value of real property held by Williams at $12,500, which was enough to earn him a place on the wealthy citizens list for 1822.[62]

George Youle was listed in the city directory of 1822-1823 as a plumber and pewterer. He had a wide knowledge of gas lighting, having used it to light his factory in 1817, and he is mentioned in connection with Charles Monell's plan to build a gasworks in 1817.[63] Youle played a prominent part in city affairs although he held no posts in city government. He was a member of the Board of Directors of the Mechanics Insurance Company and was taxed on $35,000 in personal property in 1822 according to a contemporary listing

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[61] Scoville, Old Merchants, I, 87; Lanier, Banking, pp. 132-33.

[62] Lanier, Century of Banking, p. 140.

[63] NYMCC, 1784-1831, IX, 15.

of Wealthy Citizens for 1822.[64]

A composite summary of the biographies of the directors of the gas light company reveals the strong ties between the company and government. Three of the directors-to-be had held important elective posts in municipal government. They were Samuel Akerly, Robert Bogardus and George Buckmaster whose period of service covered the years 1802 to 1819. Another individual held less important municipal positions (Josiah Ogden Hoffman) and two had had only a fleeting contact with municipal government (Samuel Leggett and Richard S. Williams). Two more were holding federal posts in 1822 (Moses Cunningham and Thomas Morris) but one of these (Morris) had served briefly as Clerk of the Common Council. Since the federal posts represented the fruits of involvement in local politics, it is fair to say that at least eight of the future directors of the New York Gas Light Company had been strongly involved or possessed more than a passing interest in city government and politics. Of the five individuals remaining, three were prominent in the public life of the city by virtue of wealth and prestige: Henry Eckford, Thomas Smith and George Youle. Youle, whose experience in gas lighting

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[64] Lanier, Century of Banking, p. 142. Youle achieved notoriety in March, 1823 with the completion of his "shot tower." From the top of this tall structure, molten lead was dropped assuming a spherical shape as it fell, allowing it to be used as a cannon ball. See the New York Evening Post, March 14, 1823.

dated back to 1817, would almost certainly have been a necessary figure in the formation of any gas lighting company in the city.

From these biographical details, certain conclusions would seem to be reasonable:

1) The emergence of the first gas lighting company in New York City owed much to the experience acquired by some of its members while serving in city government and dealing with lighting problems.

2) The ease with which the new company was able to acquire first a state charter and then a municipal franchise was a function of the close relationship between the new directors and the city government.

3) The quality of the men involved and the identification of leading business figures with the major technological problems of the growing city indicates the extreme seriousness with which the task ahead was viewed. The challenge of lighting an entire city (they saw their goal as nothing less) required the effort of its best informed and wealthiest citizens.

During the month of February, 1823, Hoffman and Morris delivered a petition on behalf of the directors of the newly formed gas company to the New York State Senate in Albany. Although the original document is said to have been destroyed in the fire which swept the Capitol building in 1911, it is known that it announced the formation of and asked incorporation for

a "Gas Light establishment" for the purpose of "better lighting the city, and the buildings, manufactories, and houses therein."[65] On February 24, 1823, the gas light petition was read on the floor of the Senate and immediately referred to a Select Committee. Nine days later, March 5, John A. King of the committee reported on the petition and introduced a bill providing for incorporation which ultimately passed without opposition. In his report, Senator King pointed out that gas light had not been used to any great extent in this country but that it had been successfully used in Great Britain since 1792. He asserted that the successful use of gas light was "completely established by the facts that the principal parts of the cities of London and Liverpool, and the extensive manufactories of Birmingham, Sheffield, Manchester and Leeds were now lighted with gas at a much less expense than when lighted by candles or oil and that numerous incorporated companies had been established for that purpose," and were "now in operation in various other parts of Great Britain.[66]

King cited as the principal advantages of gas light its "safety, purity and cheapness." Danger of fire was ever

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[65] Laws of the State of New York, 1823, 46th Sess., chap. 85.

[66] New York State Senate Journal, 1823, p. 151.

present in manufactories where much light was needed, due to carelessness in extinguishing candles or lamps. Gas could be made to issue forth or be extinguished by the turn of stop-cock. The light given by gas was soft, clean and without smoke or smell. The "air of a room lighted with it is less insalubrious than when lighted by candles or lamps," he said. Moreover, the saving in cost was considerable. Gas could yield the same brightness of light at one-third the cost. The city of New York spent annually thirty to forty thousand dollars a year for the lighting of its streets. "It is confidently believed that the introduction of gas light will materially lessen the charge."[67]

Senator King was of the opinion that incorporation was the only practical method of mobilizing sufficient capital for the undertaking. He saw little likelihood that the petitioners could, for some years, count on much profit from their investment. King introduced the bill into the Senate where it was discussed on March 17. It was passed without opposition. The Assembly took two days to arrive at a decision and the final vote was 110 in favor, one opposed. The charter of the New York Gas Light Company was signed into law on March 26, 1823.[68] The new corporation was given

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[67] Ibid.

[68] Laws of New York, 1823, 46th Session, chap. 85.

the power to manufacture and sell gas "to be made of coal, oil, tar, peat, pitch or turpentine, or other materials" for the purpose of lighting the streets and the public and private buildings in New York City. These rights were granted for perpetual duration. Certain limitations were placed on the corporation. It was not to hold real estate whose value exceeded $100,000. It could not actually go into the business of selling gas to consumers without first receiving the permission of the municipal authorities, since it was provided that "no public street, lane or highway in the city of New York shall be dug into or in any wise injured or defaced without the permission of the corporation of the said city." Should the city fail to grant its permission, then the state charter was to all intents and purposes a worthless privilege.

The charter also stipulated that the authorized capital stock of the corporation was not to exceed one million dollars. This was, for the times, an extraordinarily large sum. By 1823, New York State had some 200 incorporated manufacturing corporations. About a quarter of these had been incorporated under the New York Manufacturing Act of 1811. The rest had been set up under special charters granted by the legislature as was the case with the New York Gas Light Company. A list of incorporated companies in New York State for 1819 indicates that the typical manufacturing corporation had been generally authorized to issue capital

stock to the values of $50,000 to $100,000. The only types of corporations granted a capital stock privilege of a million dollars or more were banks and insurance companies.[69]

There is no record of the calculations upon which the request for such a large capital authorization was based. The experimental nature of the corporation and the costs of digging up streets and laying of pipes were sure to require heavy investment. The original aims of the corporation included plans for extensive lighting of the city. The legislature, however, reflected contemporary experience with abuses of the stock-issuing power granted to corporations, when it insisted on inserting into the charter a paragraph which read: "That nothing in this act . . . shall be construed to authorize any banking or insurance privileges, or the issuing of any notes, bills, or other negotiable paper."[70] There was much current opposition to misuse of the stock issuing privilege and the subsequent assumption of banking or quasi-banking functions by corporations established for purposes unrelated to the lending of money at profitable rates of interest. Chief violator had been the Manhattan Company established in 1799 by Alexander Hamilton, Aaron Burr and others, to provide the

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[69] Aaron Clark, A List of Incorporations in the State in the State of New York, Except Religious Incorporations; Report to the New York State Assembly (Albany, 1819), passim.

[70] Laws of New York, 1823, 40th Session, chap. 85.

city with "pure and wholesome water." A charter granted at that time had contained an unobtrusive clause near the end of the document which made it lawful for the company to "employ all such surplus capital as may belong or accrue to the said company in the purchase of public or other stock, or any other monied transactions . . . for the sole benefit of the company."[71] The organizers of the Manhattan Company used this clause to engage in an energetic and profitable pursuit of the banking business leaving the city to hobble along on an inadequate system of water supply. So transparent were its aims that the Manhattan Company came to be considered a bank (and was so listed) rather than a water company despite the aims of those who had granted it a charter.[72] A letter addressed to the New York delegation at this time warned of the devious guises assumed by those seeking the charter privilege. An application for the building of a saw mill, or a bridge, or even for the right to supply the public with milk might cloak a band of greedy adventurers seeking exclusive rights.[73] The directors of

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[71] Nelson M. Blake, Water for the Cities: A History of the Urban Water Supply Problem in the United States (Syracuse: Syracuse University Press, 1956), p. 51.

[72] Clark, List of Incorporations, p.

[73] Letter on the Use and Abuse of Incorporations Addressed to the Delegation from the City of New York in the State Legislature By One Of Their Constituents (New York: G. & C. Carill, 1827), p. 3.

the New York Gas Light Company through their agents in Albany sought to allay such fears. Thomas Morris, speaking for the directors, expressed the hope in a letter to Gulian C. Verplanck, a leader of the New York delegation in the legislature, that the provisions of the proposed charter limiting the company to the gas business would leave little ground for opposition on the basis of a general fear of abuse of the privileges granted.[74]

The first regular meeting of the new gas company was held on April 2, 1823. Samuel Leggett was elected President for the coming year and a committee was appointed to meet with the Common Council to obtain the necessary permission to use of the streets of the city for the laying of gas pipes.[75] A memorial to that effect was presented to the council which appointed its Finance Committee to meet with the directors of the New York Company. The Finance Committee presented a resolution to the council in May of 1823 embodying the terms of the municipal franchise for New York's first lighting company.[76] Eight conditions were set forth:

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[74] Thomas Morris to Gulian C. Verplanck, New York, February 19, 1823, MS in the files of the New York Historical Society.

[75] Minutes of the New York Gas Light Company, April 2, 1823, p. 1.

[76] NYMCC, 1784-1831, XII, 792.

1) The company was given two years to build a gas works capable of supplying the houses and public lamps on Broadway from the Battery to Grand Street.

2) The company was given five years in which to develop a gas supply capacity sufficient to light any streets or houses within its territory.

3) Gas for the public lamps was to involve no greater expense than incurred by oil in the preceding year.

4) Pipes conveying the gas were to be made of cast iron and the gas supplied was to be equal in "quality and intensity to that in use in the public lamps in the City of London."

5) Forty-eight hours' notice to the Street Commissioner was required before any streets were to be opened for the laying of pipes.

6) The manufacture of gas was to "occasion no nuisance."

7) Nothing in the grant was to be construed to prevent individuals from erecting facilities on their own premises for lighting their homes and factories with gas.

8) Failure on the part of the company to fulfill the specified conditions would give the Common Council the power to void the entire grant.

The most significant aspect of this franchise was the decision to grant the New York Gas Light Company an "exclusive" privilege for 30 years in a district of the city. This was thought to be a necessary step to assure the

provision of risk capital for a pioneer venture. A precedent was set which was to govern the formation of gas companies in New York City for the next forty years.

CHAPTER V

THE NEW YORK GAS LIGHT COMPANY

Once they obtained permission to use the city streets for their gas mains, the Board of Directors of the New York Gas Light Company took immediate action to put the company's plans into operation. Just two days after notification by the Common Council, the board outlined its plan of attack. A committee, including Henry Eckford, George Youle and Richard S. Williams, was appointed to open the books of the corporation for stock subscriptions for an amount not to exceed \$500,000.[1] Another committee, composed of Samuel Akerly, William S. Coe and Moses Cunningham were appointed to find a suitable location for its proposed buildings.[2] A third committee, made up of Samuel Leggett,Henry Eckford and Samuel Akerly was empowered to "select and send a person to Baltimore to obtain such information as may be interesting and useful to this company.[3]

The local press of May 23, 1823 carried a notice to the public that the New York Gas Light Company would offer

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[1] New York Gas Minutes, May 14, 1823, p. 5.

[2] Ibid.

[3] Ibid., p. 8.

for sale on June 2, 1823, a capital stock of $200,000 in shares of $50 each. The sale was to be held at the Franklin Bank between the hours of 10.00 A.M. and 3.00 P.M. Subscribers were allowed to make a first payment of $5.00 per share and second payment of $5.00 on the following July 2. The balance would be subject to payments as required by the Board of Directors in the future. "It is believed," the company said, "the installments now required will be sufficient to light the city from Grand Street to the Battery."[4] The public's appetite was further whetted by a reminder published on the morning of June 2 that the holders of similar stocks in English cities were finding them a most profitable form of investment and that "for aught we can see, the present undertaking is equally promising."[5] The apprehensions of the directors were allayed by the public response. Despite the fact that there was not really a sound and profitable gas company operating in the whole of the United States, the initial issue of 4,000 shares was oversubscribed in short order.

The plan to send a person to visit the gas works in Baltimore seems to have been shelved. Instead, it was resolved at the June 2, meeting of the Board of Directors that the finance committee send someone to England to gain

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[4] New York Daily Advertiser.

[5] Ibid., June 2, 1823.

information and to act as engineer for the new company. The committee was also charged with the task of finding a suitable person to act as superintendent of the gas works.[6] One man was found to fill both requirements. He was Timothy Dewey, a New Englander by birth, who had been employed as a civil engineer in Albany until 1823 when he moved to New York City to become editor of the Mechanics Gazette.[7] Arrangements were made for Dewey and George Youle, a member of the board, to visit England to acquire information about the gas business.

The decision to send an untried and newly appointed plant superintendent to England on a journey involving considerable expense and time was an unusual one, especially as there were so many American "inventors" of gas lighting willing to present the benefits of the latest English discoveries.[8] They were aided in their activities by an

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[6] New York Gas Minutes, June 2, 1823, p. 8.

[7] Adelbert Milton Dewey, Life of George Dewey and Dewey Family History (Westfield, Mass.: Dewey Publishing Company, 1898), p. 453.

[8] See Nelson F. Adkins, ed., The Index to Early American Periodicals. An index in the General University Library of New York University (at Washington Square). This index is reproduced on microprint cards housed in the Reference Room. It was prepared in the 1930's from resources of New York City research libraries by WPA workers under supervision of local university faculty and library staff. Consult the index under the headings "gas lighting," "lighting," etc., for an unusual view of the vitality and imagination of American inventors during the first quarter of the 19th century.

unusual London periodical, available in America, called The Repertory of Patent Inventions and published between 1794 and 1825 which contained convenient explanations and diagrams, among other things, of the latest developments in British gas lighting.[9] The directors of the company, however, were probably influenced by the advice of Thomas Cooper, an expatriate Englishman and Jeffersonian radical, a lecturer in chemical science at several American universities and author of the most important available publication on gas lighting, who wrote:

> I cannot recommend to a coal gas association the commencement of it independently of any resort to those who supply the British establishments. Fulton,

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[9] Some of the concepts and publications involved in the problem of technological transfer are briefly discussed by Brooke Hindle, Technology in Early America: Needs and Opportunities for Study (Chapel Hill: University of North Carolina Press), pp. 18-19. American publications that played an important role in the development of American technology in this period are mentioned on pp. 35-36. American dependence on British technological publications is illustrated by the following:

"It seems that some person who burns coal gas in Philadelphia has taken out a patent for his invention. Wherein the invention consists would be as difficult to discover in this instance as it is one of the many numerous patents which swell the records of Dr. Thornton's office. The Repertory of Arts published in England, is a most prolific parent of American patents, a position which may be fairly assumed without any disparagement to the inventive faculties of our countrymen." "Coal Gas," National Register, I (March 2, 1816), 2-4.

> whose mechanical skill was of no ordinary stamp, found it prudent to purchase his first steam engines from Boulton and Watt. When he had furnished the models for the American artists to work on, and enabled them to profit by British experience, he resorted to his countrymen to supply the demand. All the apparatus necessary for lighting the streets of our capital cities can be procured at a reasonable rate, either from the engineers in London, or from Boulton and Watt of Birmingham.[10]

And again:

> To persons, therefore engaged in a coal manufactory on a large scale, no information that could be given, either in this, or in any other publication, would supersede the prudent necessity of sending to England for the plan, and for the apparatus required to put that plan into active operation.[11]

Dewey sailed alone (George Youle had withdrawn) for Liverpool on June 16, 1823. Dewey was supplied with a letter of credit giving him the power to negotiate bills of exchange to be drawn against the company for the purchase of equipment and supplies needed for the construction of a gas works in New York City, and a letter of instruction outlining an itinerary of cities and firms to visit. The latter document showed great care in its framing. In view of the technical details and knowledge of the English gas industry it exhibited, it may well have been the work of Dr. Samuel Akerly, member of the board and old-time member of the

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[10] Some Information Concerning Gas Lights (Philadelphia: John Conrad and Co., 1816), p. 141.

[11] Ibid.

Committee in Arts and Sciences which had conducted experiments in gas lighting for the Common Council in 1816-17.

The complete instructions reveal the company's recognition of their dependence on British precedent:

> You are to proceed in the next Packet for Liverpool, at the expense and in behalf of The New York Gas Light Company, to obtain information, and perform such duties as are hereinafter directed, and to return as soon as possible consistent with the views and objects of the Company.
>
> Herewith you will receive a Bill on Liverpool for £500 Stg. for the expenditure of which you are to account to the Company on your return.
>
> If any purchases you make for the Company should exceed the amount of your funds, you are authorized to draw on Samuel Leggett, President of the Company, payable when he receives the property so purchased, or he will remit the amount in a Bill of Exchange.
>
> In order the more clearly to understand the duties required of you, please attend to the following particulars.
>
> Absence.
>
> Allowing you a month to go and a month to return you will probably be enabled to perform all that is required of you, by a month or six weeks residence in England, and you will therefore not prolong your absence more than is necessary.
>
> During your absence you will make yourself acquainted with the construction of the machinery, the putting it together and the manufacture of gas for illumination, whether made of coal or oil, and this you must do by enquiring of those who know, reading on the subject, and examining for your self such apparatus and manufactories of Gas, as your letters of introduction will enable you to visit, in Liverpool, London, or such other places you may pass thro'.

Arrival at Liverpool.

Immediately on your arrival at Liverpool you must ascertain the best method of constructing Gazometers, and the size that is most convenient for use, and best adapted to manage in case of repairs. You will also find out every thing necessary in relation to the main pipes, &c. &c.

Purchase.

You are hereby authorized to purchase the materials for the construction of a Gazometer, and ship it to New York to the President of the Company. You will also purchase sufficient main pipe to lay down one mile, and ship the same with the materials for the Gazometer, before your return, together with a quantity of lateral pipe, burners, lamp and stop cocks.

Books, plans, &c.

Before you leave Liverpool, you will purchase such books, plans, drafts, &c. relating to the subject of Gas illumination as you can procure, and send them by return of Packet, to the President.

It is desirable to receive from you all the information respecting the Gazometer and Furnace, and drafts of the same, that the Company may be doing something during your absence, and be ready to proceed forthwith on your return. You will therefore write by return of the Packet, and send such information as you may collect together with Accum's 1st and 2nd works on Coal gas, and Peckston's on Gas Illumination, and such other Books and plans touching the subject as you may find useful.

London.

When you are in London, visit Messrs. Taylors & Martineau, the inventors and improvers of the Oil gas apparatus, that you may ascertain from them the latest improvements, and every thing in detail, relating to Oil gas, which they will communicate voluntarily or for compensation, recollecting that they have a patent for their inventions.

It is not by mentioning London and Liverpool, intended to restrict your visit to those two places, but you are at liberty to proceed to Edinburgh or any

other place in Great Britain, that you may deem expedient, to promote the interest of the Company.

Portable Gas Lamp.

Make yourself acquainted with David Gordon's patent portable Gas lamp, and bring with you four such portable lamps, with the apparatus to condense the gas, and ascertain if it has been, or can be usefully appled to Street lamps, or other standing lights in houses or Stores, &c.

Street Lamps and Burners.

Send out a moddle [sic] of the most approved Globe or Street Lamp for the exhibition of Gas light, as also samples of the different kinds of Burners used or employed in Public or in private buildings. Ascertain also if a large space may be lighted from one station, and if so the method and the fixtures by which it is accomplished.

Oil and Coal Gas.

It is probable that oil will be the best and cheapest article that can be used by this Company, but you are nevertheless to make yourself equally acquainted with the subject of Coal gas in detail, as circumstances may require it to be used.

Disputes have run high in England as to the preference of oil-gas or coal-gas, but it is easy to imagine that one may be preferable in one place, and the other in an other place, and that times and circumstances may change their relative conditions. The Company therefor desire information, both on the subject of Coal-gas and oil-gas.

In order that this Company may commence their operations under the most favourable circumstances, you are authorized to engage for one year, one or more workmen or Artisans, who are capable of putting together the main pipes, constructing the Gazometers, and of making themselves otherwise useful. You will engage them for one year, pay their passage out and allow such sums as you judge reasonable.

You will take advice on this subject, and be careful not to commit yourself to the penalty of the laws of the Country for enticing away artisans or mechanics, &c. &c.

If you can send such a man out with the main pipes and the Gazometer, before you return, it would be advisable.

While in London examine Mr. Clegg's rotary Gazometer to ascertain if it is preferable to one suspended in the usual manner. And do not fail to visit the Theatres lighted with gas, and learn all that you can in relation to the large Globe lights and other fixtures, and the manner of supplying them with Gas.

Do not omit to enquire and ascertain the best method of preventing the retorts for Oil gas from losing their power to decompose oil, and the best shape, size, and position of such retorts, and send out six such retorts, with the necessary appendages connected with a Furnace for oil gas.

In making a calculation for the main pipes in Broadway, their proper size and taper, &c. you will recollect that the distance from Grand Street to the Battery is 6880 feet, being little more than a mile and a quarter. The main pipe will enter Broadway from Pearl street and one third of the 6880 feet will lie North and two thirds south of Pearl Street. In Broadway south of Grand Street are Buildings and public lamps to be lighted. Broadway is eighty feet wide, and the mains in this street must hereafter diverge thro' intersecting streets.

In calculating the size of the Gazometer you must bear in mind that the contemplated location for the Factory is in low ground where the cistern for the Gazometer cannot be more than six or seven feet under the surface. It may therefore be necessary to have two or three Gazometers instead of one.

Inquire and let the President know as soon as possible after your arrival in England the state of the different Gas light Companies in Great Britain and the market price of the Stock and dividends, &c.

Bring with you or send out the Gas-metre and learn the methods employed to prevent the waste of Gas, by those who are supplied by the Company.

Besides these instructions, much is left to your discretion; they are not intended to restrict you. The company have full confidence in your good attention and ability. They therefore authorize you to enter into arrangements, which after possessing yourself of every

> necessary information, you shall judge most condusive [*sic*] to its interest and best calculated to ensure, not only certain success to the objects of the Incorporation, but an other and principal object, a speedy going into operation, and during the ensuing autumn if possible.
>
> You will cause all property ordered and purchased by you to be sent to Cropper Benson & Co., Liverpool, and by them shipped to the President under full insurance.
>
> We should like to have their method of keeping the Books against those whom they charge with light.
>
> New York June 14th, 1823.[12]

From the days when the Chartered Gas Light and Coke Company first began to light London streets in 1814, to 1823, the year of Dewey's arrival, gas works in the British Isles had multiplied rapidly. Above all was this true of the city of London where a report to Parliament in 1823 described four great companies possessing gasometers capable of storing 914,470 cubic feet of gas. The annual production of gas was given as 397,000,000 cubic feet which supplied 61,203 private dwellings and 7,268 street lamps.[13] An American newspaper in 1821 marveled at the manner in which the city's principal streets were lighted with gas as were most of the public buildings. The theaters in

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[12] New York Gas Minutes, pp. 14-23. A transcript of the "Instructions to Mr. Dewey on his trip to England" has been entered here.

[13] William Congreve, "Observations on Gas Light Establishments..." *Annals of Philosophy* (London), V (June, 1823), . 412.

particular drew attention for they were lighted by individual gas plants and gas meters which produced a light that was "the most brilliant that can be imagined."[14] It was estimated that by 1829 there were some 200 "gas companies" in London many of them operating on small amounts of capital.[15]

Dewey landed at Liverpool in July, 1823, and found himself immediately involved in the great public debate sweeping gas circles in the British Isles. Several manufacturing interests, including the firm of Taylor and Martineau to whom Dewey had been directed, were proclaiming the merits of "oil gas," a product of a process of manufacturing illuminating gas based on oil (almost any kind of oil would do), and holding it to be superior to gas produced from coal ("coal gas").

In 1805, William Henry, a leading British scientist, had conducted a series of experiments with various substances to ascertain their properties as gas producers. In an article in Nicholson's Journal of that year, he called attention to the highly satisfactory results obtained with

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[14] Thomas Jarman, "On Gas Lights," American Journal of Science, III (1821), 171.

[15] Dean Chandler and A. Douglas Lacey, The Rise of the Gas Industry in Great Britain (London: British Gas Council, 1949), p. 72.

oil gas.[16] In 1815, John Taylor obtained a patent for an apparatus for the decomposition of oil and other substances for the production of illuminating gas. The firm of Taylor and Martineau (not related to the inventor) acquired, in 1819, the right to use John Taylor's patent. They set up a business based on the manufacture of gas equipment and apparatus using the oil gas process. For due financial considerations they allowed interested parties the use of their equipment and, where necessary, provided engineering and other technical advice. In 1819 a demonstration of the new process was held in the Apothecaries Hall in London. Several articles appeared concurrently in leading journals of the day praising the new process and urging its use.

What was unusual about the events so far described was the severe attack on coal gas which accompanied the praise of oil gas. Thus the writer of an article in the _Journal of Science and the Arts_ in 1820 declared:

> The producing from coal of an aeriform fluid which could be distributed at pleasure in every direction, for the purpose of economical illumination, has justly been ranked among the greatest benefits which science and the enterprise of this country have conferred upon mankind.
>
> Important as is the discovery, many defects have arisen on its adoption; coals contain a large proportion of sulphur, which is volatilized with the gas, and _it has hitherto been found impossible to purify it sufficiently for lighting close rooms_. The _suffocating_

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[16] _Ibid._, p. 59.

> smell and the property which it has of tarnishing everything metallic, exclude its use from dwelling houses on account of the injury it would do to our health, our furniture, books, pictures, plate, paint, etc. At the same time that the gas which affords light is produced coal, another gas (hydrogen) is also formed and mixed with it in large proportion, which on being ignited, occasions great heat without adding to the light; these effects render coal gas unpleasant in sitting rooms and have nearly confined its use to open shops and street lamps.[17]

The supporters of coal gas replied in the press and public journals, pointing to the great advances in the purification of coal gas, stressing its cheapness and decrying the claims by oil gas partisans of superior illuminating ability for their process.

The climax of the controversy erupted in 1824 when an application for the establishment of an oil gas company in London was forwarded to Parliament. Leading figures of the day in the gas industry and in scientific circles were called upon to testify before a parliamentary committee of enquiry. The noted scientists, Sir Humphrey Davy and Michael Faraday, spoke in favor of oil gas. Sir William Congreve, Government Inspector of Gas and other works, published a series of reports which were more or less favorable to oil gas.[18]

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[17] William Matthews, *An Historical Sketch of the Origin, Progress and Present State of Gas-Lighting* (London: Rowland Hunter, 1827), p. 108.

[18] *King's Treatise*, I, 43.

Dewey followed the entire controversy with great interest. The purpose of his visit to England and his presence at a demonstration to determine the comparative illuminating power of oil gas as opposed to coal gas was noted by a contemporary historian of gas lighting.[19] His systematic visits to gas works in England, Ireland, Scotland and Paris and his persistent questioning of their managers had evidently acquired for him a reputation for knowledge and expertise in the gas business; for just as Dewey was making preparations to return to America, the editor of a leading English journal, The Annals of Philosophy, asked Dewey to write an article summarizing his experiences. Dewey's article which included a reference to the oil-gas controversy, reflects the pragmatic approach of Americans at this time as well as the spirit which was eventually to characterize the way Americans "borrowed" but then altered the borrowings to fit local conditions. Dewey wrote:

> I see no good reason that they should not both do extremely well, though some scientific, not practical men, may try to make us believe that one or the other is good for nothing. I see they are both good, and there is plenty of room for both in this great manufacturing country. I shall recommend to my employers to begin with oil gas, because it is the best, and oil being cheap and coals dear, it will be the cheapest, and will not cost nearly

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[19] Matthews, Gas-Lighting, p. 160.

> so much to begin with as coal gas, and we shall require fewer hands to carry it on. I can more easily manage it.
>
> When I can get coals as cheaply as they do at Sheffield, and some other places, I may make coal gas too. Besides, I need not lay down pipes more than one-third as large for coal gas and this is a great saving; so we shall all save by it. You ask me to tell you how much oil gas costs, and how much profit may be made by it. I cannot tell you anything about that till I have erected works, and made some oil gas and see how many people use it, and what they will pay for it. I have given you more opinions already than some may think correct. If they desire to possess more information I would advise them to travel as I have done, and inquire of every one they can find to tell them; and I am certain they will eventually acquire it. I think the gas-lighting system in its infancy even in this country, and to learn all about it, you must see all engaged in it. I have not seen half of them, but must go home to do the best I can.[20]

As Dewey left for home early in 1824, the issue was far from resolved. The parliamentary enquiry denied the application of an oil gas company in London after hearing testimony which implied that the oil gas process was unduly expensive and uneconomical for the lighting of a metropolis. Despite the vogue for oil gas in 1820's, most such plants were abandoned or converted to coal gas in the 1830's.[21]

The debate had been a highly emotional one. Some of the accounts of successful use of "oil gas" lighting were

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[20] "Remarks on different Gas Works and the Substances from which Gas is usually prepared," Annals of Philosophy, XXII (December, 1823), 405.

[21] Dean Chandler, Outline History of Lighting by Gas (London: South Metropolitan Gas Company, 1936), p. 59.

later described as "fallacious"[22] and among those who seemed to have used unseemly tactics for the promotion of favorable reports in oil gas was the firm of Taylor and Martineau.[23]

Events were later to show Dewey and the directors of the New York Gas Light Company that oil gas had serious drawbacks as a source of illuminating gas. Conversion to a different process was accomplished a bare three years after the company had begun its initial operations with oil. The whole incident seemed to indicate that "scientific men" who made judgments and advanced theories on technological matters very often lagged behind "practical men" whose knowledge was derived from experience.

A paragraph in Dewey's instruction had directed him to find out about David Gordon's patent portable gas lamp, and to procure four such portable lamps, with the necessary apparatus to condense the gas. From the earliest days of gas lighting, attempts had been made to develop gas containers which would yield a light possessing the illuminating power of gas combined with the portability of candles and oil lamps. In 1819, David Gordon and Edward Heard of London had successfully applied for a patent for a "portable gas lamp." The lamp was described as a "vessel made of sufficient strength

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[22] King's Treatise, I, 43.

[23] Matthews, Gas Lighting, pp. 403-414.

to admit of gas being pumped into it under pressure,"[24] and the American Journal of Science in 1821 had carried a brief description of David Gordon's lamp.

> They are made of strong copper either spherical or cylindrical with hemispherical ends. The gas from coal or oil is forced into them by a condensing pump, and is discharged through a stop cock to the burner. . . . If the gas be obtained from oil, such a lamp will burn twelve hours. . . . Such lamps can be filled with very little expense or trouble in every form where there is a public manufactory of coal gas.[25]

Dewey's report to the directors makes no further allusion to the process. It is probable that his investigation of the device showed it to be of uncertain practicality (despite the establishment of several companies to produce a portable gas lamp in London and other British cities). The gas within the containers was never fully ejected and the lamps failed to burn as long as was promised. The expense of filling and refilling the containers and the costs involved in delivering them to customers made it difficult, if not impossible, to compete with coal gas companies.[26]

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[24] Great Britain, Commissioners of Patents, Abridgement of the Specifications Relating to the Production and Application of Gas (Excepting Gas Engines) (London: The Great Seal Patent Office, 1860), p. 30.

[25] "Portable Gas Lamps," American Journal of Science, III (1821), . 371.

[26] Peckston, A Practical Treatise on Gas-Lighting... (London: Herbert, Cheapside, 1841), p. 104.

The thoroughness of Dewey's investigation is reflected in the report which he delivered to the Board of Directors shortly after his return on February 3, 1824.[27] He described in detail his visits to the gas works of almost a dozen important cities in the British Isles, as well as Paris, where he made a last-minute trip to investigate an unusual gas process. Dewey seemed to have had the knack of inspiring openness and confidence among managers, scientists and engineers. In some instances, it is highly probable that after one of his systematic surveys, he knew as much about a particular gas business as those engaged in it. After landing at Liverpool he spent 20 days examining both a coal gas works and an oil gas works in operation, attempting to evaluate the efficiency of each type of operation. In Glasgow he was introduced to a Mr. Neilson, the manager of the gas works, by Robert Hartie, President of the Philosophical Society in that city. "Here I found that gas lighting had been taken up as a matter of Science," he wrote, "that the results had been critically and ably examined, and that the results were most satisfactory."[28] He visited a small gas work at Leith, but doubted whether it could ever be made profitable in so small a town. At

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[27] New York Gas Minutes, February 19, 1824, pp. 19-23 (a transcript of Timothy Dewey's report to the Board of Directors).

[28] _Ibid_., p. 19.

Leicester, he found a small manufactory "being conducted under very favorable circumstances," in which the sale of coke paid "all the expenses of manufacturing so that the whole amount of sales could be allocated to profit.[29]

Upon his arrival in London on September 14, he was overwhelmed by the effect of the city lighted by gas. "A new scene here opened upon me, and how to describe the Gas light establishments of this immense city, I know not." According to Dewey, the annual consumption of gas at this time was 450,000,000 cubic feet of gas. The Post Office, he pointed out, burned 600 lights day and night. A gas works on Bow and White Chapel road burned nearly 900. He admitted that his account of the extent of gas illumination was only an approximation as "many of the companies could not state to me the exact number of their burners from the defective manner in which their Agents make their reports and secrecy observed from the interested motives of others." Much of his time in London was spent on experiments with oil and coal gas and in executing contracts with manufacturers for the supply of pipes and apparatus for the prospective New York gas works.[30]

Dewey left for Paris in October to examine a report that an oil gas works was in operation there which extracted gas from oleagineous seeds. Evidently lacking the time to

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[29] Ibid.

[30] Ibid., p. 21.

investigate in great detail, Dewey rendered no judgment on the seed process but he did note that gas lighting technology in Paris seemed to be inferior to that in many parts of England. He returned once more to England and made final preparations before his voyage home. In addition to having arranged for the purchase of enough cast iron pipes to lay five miles of mains, he ordered "one complete set of apparatus containing six retorts, one gasometer and the necessary appendages to contain about 18,000 cubic feet of gas." A small "gas stove" (works for producing gas) was added so that the gas mains could be tested while they were being laid. Four iron lamp posts and fittings were purchased as samples, as well as other apparatus to be used for experiments while the New York works were being erected.

Dewey kept in mind his original instructions to hire for one year workmen or artisans skilled in the construction and operation of gas works and also the admonition to "be careful not to commit yourself to the penalty of the laws of the country for enticing away artisans or mechanics." His recruitment of British laborers was quite modest. He engaged one man as a "pipe layer" and two other men to be supplied by the contractors to aid in the installation of retorts, gasometers, etc.

The most important aspect of Dewey's report was his recommendation that the works be constructed according to the oil gas process. He had become convinced that oil gas

works would provide a superior light, require a smaller gas works and be easier to manage. He added the thought that Broadway could be lighted by January, 1825, and that with "good and rigid management" the new works might be made a profitable concern. If he had any reservations, they sprang from his awareness of the difference between Europe and America. "Our local situation differs so materially from that of any City in Europe, the genius of our people and institutions being so diverse from theirs, and the little knowledge we have of this subject cause me to hesitate when an opinion is asked."[31] But Dewey assured the board that he had "formed such connections with the Scientific and practical men of Great Britain and France as will enable me to receive for the use of the Directors information of any new discovery and useful improvement."[32]

His European experiences had convinced Dewey that a property in Little Cross and Water streets which had been purchased by the Board during his absence would be unsuitable for a gas works, and he recommended renewal of the search for a larger and better located lot. Among the most important of Dewey's recommendations was one recommending the use of gas meters both to register the quantity being produced daily at the gas works and to ascertain the quantity being used by the consumer.[33] The Baltimore Gas Light Company at the time

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[31] Ibid., p.22.

[32] Ibid.

[33] Ibid., p.23.

was still conducting its business by charging the consumer for the number of "lights" in use, a system which, as we stated earlier, threatened its financial stability due to wide disparity between gas used and gas paid for.[34]

Dewey's report was received with enthusiasm. The directors entered in the minutes a commendation for the "intelligence, zeal and integrity" with which their new manager had fulfilled his assignment. The modest sum of $850, which Dewey calculated as his travelling and personal expenses, and the "obligations" incurred by Dewey and owing to various individuals in Liverpool, Glasgow and London were accepted by the Board without question. Dewey's fact-finding trip had laid a solid foundation for the initiation of New York's first gas works and remained for many years thereafter a "bible" for the gas industry.[35]

The board intensified its efforts to find a new site for a gas works. On April 8, 1824, Samuel Leggett, acting for the company, purchased a rectangular parcel of land, 185 x 100 feet, from the estate of Abraham K. Beekman. This lot, covering the northern portion of a city block, fronted on

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[34] Alfred Lief, Metering for America: 125 Years of the Gas Industry and the American Meter Company (New York: Appleton-Century-Crofts, Inc., 1961), p.3. See also King, Consolidated of Baltimore, pp. 38-41.

[35] Frederick L. Collins, Consolidated Gas Company of New York: A History... (New York: Published by the Company, 1934), p. 39.

Baxter, Hester and Rhynder (now Center) streets, and the works built upon it came subsequently to be known as the Hester Street Station. The purchase price of the property in 1824 was $9,000.[36] The purchase seemed a strategic one. The land lay just one block below Grand Street, the northern boundary of the company's franchise and two blocks east of Broadway, the major thoroughfare in the city. It was located in what was then the Sixth Ward, the heart of the growing city. It was an area which was to see much new building of homes and stores with the consequent migration of wealthy and middle class residents from the lower portions of the city. The property was completely satisfactory to Dewey, and he began immediately to draw plans for the construction of a gas works. By the middle of May, 1824, work on the new plant had actually begun. In July the laying of gas mains was begun. Dewey applied to the Common Council for permission to "make a fire in a Grate in the Streets for the purpose of melting lead to form the joints of the gas pipes."[37] Six-inch mains were laid in Broadway and other major thoroughfares; two-inch mains were used for side

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[36] Walter V. Clarke, comp., Research into the real estate activities of the early gas-light companies on Manhattan Island... MS in the files of the Consolidated Edison Company, undated , p. 14.

[37] NYMCC, 1784-1831, XIII, 792.

streets.[38]

There was an air of expectation as New York awaited its first gas lights. The Board of Directors and Dewey had shrewdly decided to keep up the public's interest by arranging a series of exhibitions. On April 22, 1824, the public was invited to visit a house at 286 Water Street in the basement of which Dewey had erected his experimental gas stoves. This was the first house in New York city to be lighted by gas. The demonstration was repeated for several days and attracted the attention of a great many New Yorkers despite the unfavorable state of the weather.[39] The press reported, concerning this experiment in gas lighting, "All doubt as to its practicability was at once removed. In point of economy, safety and cleanness it appeared perfectly obvious that this mode of lighting our streets, public buildings, manufactories and dwelling houses surpasses everything of the kind that has hitherto been attempted by oil or candle."[40]

The next exhibition seemed squarely aimed at both Common Council and the public. One of Dewey's "sample" lamp posts brought home with him from London was erected on

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[38] A section of 2 inch main is on display in the Library of the Consolidated Edison Company. It was excavated on Cherry Street in 1918. Made of cast-iron, it has a wide flanged lip at one end where the connection or joint was made.

[39] Stokes, Iconography, V, 1638.

[40] New York Evening Post, April 23, 1824.

Franklin Square (one block from 286 Water Street). On the evening of June 11 it was lighted for the gratification and amusement of the assembled citizens. The New York Evening Post reported: "although only a small burner has been placed in the lamp any person may comfortably read a newspaper by it. As the corporation has contracted with the company to light the city with gas, it is to be presumed that they will take care to order lamps of this description."[41] On June 23, at the invitation of the Directors of the New York Gas Light Company, the members of the Common Council visited the lamp post in Franklin Square. Announcing this visit, the Post remarked: "There is now only one opinion as to the great advantages which our city will derive from this improved mode of lighting our streets, manufactories, public buildings and dwelling houses."[42] The success of the New York Gas Light Company's exhibitions in the first half of 1824 did much to create a favorable public opinion. This was reflected in the fact that the price of the company's stock rose 30 per cent above par immediately after the Water Street lighting.[43]

There had been some delay in the plans for construction of the new gas works. Violent storms at sea had

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[41] Ibid., June 12, 1824.

[42] Ibid., June 23, 1824.

[43] Ibid., May 12, 1824.

delayed arrival of the equipment and supplies purchased in England by Dewey. When the ship finally arrived in June, two months overdue, the press announced that the laying of gas mains would be commenced immediately and predicted that a part of Broadway, and Pearl Street as well, would be lighted with gas that winter.[44] Less than a month later, it was observed that gas mains had been laid in Canal Street as far as Broadway and the ground had been opened to continue them to the Battery.[45] As the gas works neared completion in the fall, Dewey posted an announcement in the press inviting subscribers to arrange for the service:

> Storekeepers and all others who may desire to use this safe, pure and economical light are invited to apply to have service pipes laid before the hard frost sets in. These pipes will be carried within the walls of the customer's houses and stores at the expense of the Gas Company. The interior fittings can be done in winter at the expense of owners or occupants.[46]

The company decided that fall to institute yet another demonstration to further dispel the fear of gas. The home of Samuel Leggett, president of the Board, was fitted up with gas lights and the public was invited to visit the home to inspect its system of gas lighting.[47]

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[44] _Ibid._, June 23, 1824.

[45] _Ibid._, July 16, 1824.

[46] _New York Daily Advertiser_, October 11, 1824.

[47] _New York Evening Post_, October 4, 1824.

Seven Cherry Street, site of the Leggett residence, was located on one of the most esteemed streets in the city. George Washington had lived at No. 3 Cherry Street when New York was the federal capitol.[48] John Hancock had been a resident of No. 5 Cherry Street. No. 7 was a handsome house of solid timbers and red brick built in the style which only the affluent could afford in that day.[49] Its illumination was a marked success, and did much to increase the prestige of the new company. The crowds that came to see the gas lights were so large that they filled the house and the street in front and caused a problem for the local constabulary. The demonstration continued for several days.[50] The prevailing excitement was reflected in an account published on October 13, 1824:

> We last evening visited the dwelling of Samuel Legget, Esq., . . . each room of which was literally illuminated by the most vivid and pleasant light we ever beheld. The ornaments through which the gas may be made to escape may be fashioned to any fancy. In the two best rooms of Mr. Leggett's house the light issues

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[48] Ernest J. Brierly, The Streets of Old New York: A Pictorial Rebirth of a Vanished City (New York: Hastings House, 1953), p.80.

[49] Robert E. Livingston, "The Span of 84 Years," Gas Logic, II (October, 1907), 4.

[50] Lindsay Denison and May Fischel, Villages and Hamlets Within New York City: An Account of Some of the Tiny Communities Out of Which Grow the Greatest City in the World (New York: The Press Publishing Company, 1925), p. 14.

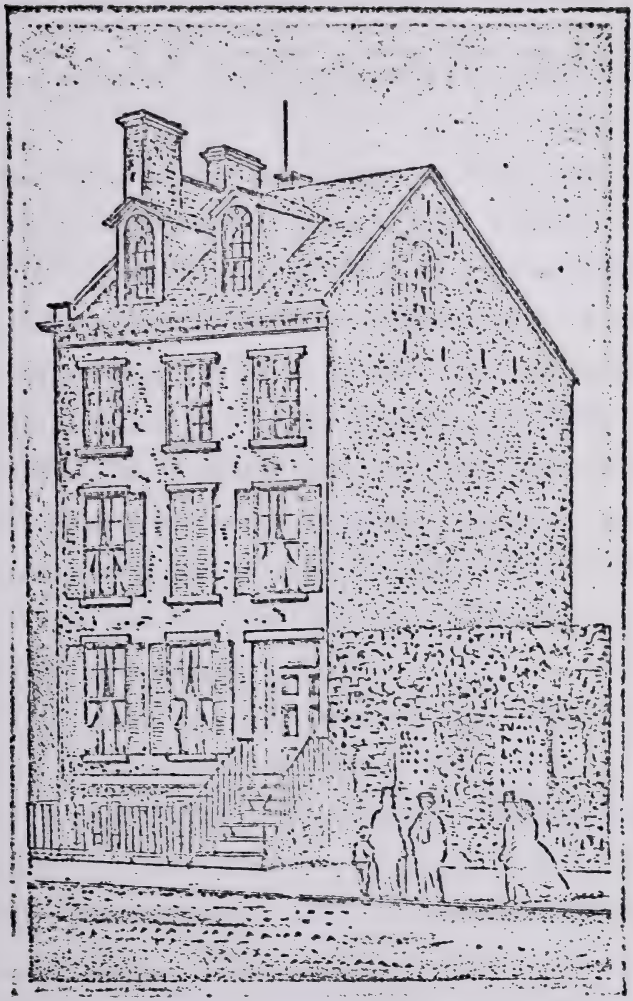

Figure 3

Residence of Samuel Leggett at 7 Cherry Street
Illuminated by Gas October 4, 1824

> from two handsomely gilded or bronzed chandeliers suspended from the centre of each room. One cluster of lights was shaded with glass, and the other with porcelain. The mantle light received the gas through an invisible tube introduced through the marble mantlepiece. The effulgence of these lights have a wonderfully fine effect upon the human countenance by affording it a youthful brilliancy and adding splendor to every surrounding object.[51]

The event was so widely reported and discussed in the city that more than one historian has been led to believe that Leggett's home was the first to be lighted with gas.[52] But, as has been pointed out, this distinction is more properly bestowed on 286 Water Street. The two houses were, however, not far apart. The Water Street residence is directly behind No. 7 Cherry Street, and it was in the Water Street home that Dewey had erected his "stoves" and small scale gas-making equipment. Pipes leading out from Water Street provided gas for the lamp post on Franklin Square and Leggett's home as well.

The successful exhibitions of gas lighting which the company had conducted in 1824 served their purpose. The lighting of Leggett's home was timed to coincide with the public appeal for subscribers to the service which appeared in the press of October 11, 1824.[53] Such was the public's

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[51] _Springfield Republican_, October 13, 1824.

[52] See Wilson, _Memorial History_, III, 331.

[53] _New York Daily Advertiser_.

confidence that Mr. Weed, secretary of the company, received in short order applications for the installation of gas light in 300 buildings in the city. The first users of gas included commercial establishments, private homes and important public institutions. The Merchants Exchange in Wall Street announced its intention of installing a gas light on top of the cupola of its building to be visible to ships coming into port.[54] By early December, six miles of gas main had been laid in the principal streets of the city while the plant at Hester Street was so close to completion that assurances were given for the supply of gas in January, 1825.[55]

According to a description in a New York City guide book, published in 1828, the Hester Street plant was "one of the largest edifices in the city." The building was built of brick and "formed three sides of a square." Within the square were contained the retorts or furnaces, and the gasometers or storage tanks. Each gasometer had a capacity of "5,000 barrels" and was "equal in size to a large brewers vat being 50 paces in circumference and 20 feet in depth." The gas was measured by a "curious machine called a meter and passed out into all the principal streets south of Grand Street through pipes of cast iron, of various sizes, from six

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[54] Evening Post, December 7, 1824.

[55] Ibid.

inches to two inches bore; and by lateral pipes into the private houses, where the company pipes end."[56]

The New York Gas Light Company began the supply of gas to street mains early in 1825. The exact date is unknown. An unpublished history of the Consolidated Gas Company, of which the New York company was the earliest component, was compiled by J.H.G. Pierson, an official of the company, aided by a staff of researchers.[57] After a careful search of the New York press for 1825, Pierson and his staff were unable to find a direct reference to the event. A reference in an article in the New York American of February 26, 1825 to an explosion earlier in the month led the Pierson group to postulate that the "explosion" referred to in the article actually referred to the turning on of the gas. The date they arrived at was February 14.[58] A letter from the office of the New York Gas Light Company to Frederick B. Chandler, professor of chemistry at Columbia University, written in 1876,[59] indicated that officials of

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[56] [Edmund March Blunt] The Picture of New York and Stranger's Guide to the Commercial Metropolis of the United States (New York: A.T. Goodrich, 1828), p. 421.

[57] The Pierson MS was completed sometime in the early 1930's. Frederick L. Collins, Consolidated Gas Company, published in 1934, is almost a verbatim copy of the Pierson MS.

[58] Pierson, Consolidated Gas, pp. 73-76.

[59] Unsigned letter to Professor Chandler from the office of the New York Gas Light Company, January 10, 1876, MS in the files of the Chandler Papers, Columbia University.

the gas company had in their possession records of bills for gas supplied from January 5, 1825.[60] The New York Advertiser, however, announced on January 31, 1825 that the cisterns of the gas company were being filled with water and that "in a few days the . . . Company will commence the diffusion of its brilliant light." Perhaps these contradictory accounts each contain a portion of the truth. It is doubtful that Dewey would have attempted a discharge of gas into all mains at once. Most probably, gas was allowed to flow to a portion of the mains while gas company officials checked the mains for leaks and visited customers' houses to assure themselves that all was working well. A larger flow may have occurred on February 14, thus laying the basis for the gas explosion referred to in the New York American. Some time might have been required before gas was allowed to flow freely into all gas mains. The press may well have been immobilized by an event quite common in the development of any new technology— the "down" time required to iron out unforeseen difficulties which impair or retard the productive process.

As gas began to flow regularly through the mains, dissatisfied customers besieged the office of the company. An inadequate supply of fixtures and chandeliers had prevented the supply of gas to all who had signed contracts. The crisis was finally relieved by the arrival of a long

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[60] Ibid.

overdue shipment of the necessary lighting fixtures from England. By April 13, 300 dwelling houses and stores were being lighted with gas.[61] An "offensive smell" was complained about by some of those using gas and the fault it was later announced was due to leakage in the pipe joints. The company was able to eliminate the unpleasant odor by repairing the faulty joints.

Strollers on Broadway were delighted on the evening of April 12 to see Henry Andrew's elegant carpet and upholstery shop "brilliantly" illuminated with gas. Visitors to the store commented upon the absence of any "offensive" smell from the gas lights. The proprietor revealed that gas was conveyed from the main pipe lighting his store to his private room above. The Post on the following day urged the public to visit the store to see for themselves the "unexceptionable nature of gas light."[62]

New Yorkers did not view gas lights with equanimity or indifference. Moral earnestness, sarcasm, astonishment, humour and almost every species of active human emotion were among the recorded comments. The "superiority" of gas over old fashioned types of illumination is reflected in the reaction to the gas light in front of a coffee house on Nassau Street:

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[61] Evening Post, April 13, 1825.

[62] Ibid.

> It is really worth a walk to the Star Coffee House . . . to see the beautiful lamp in front of the door. It throws so much "light upon the subject" that we almost forget "the heavens are hung in black" or that the "shades of night" are around us . . . and as one of our brother editors would express himself, "it looks down with conscious pride on the little lamps that twinkle in their insignificance at a distance." The proprietors of most of the public places of amusement, and of our fashionable establishments are making arrangements to introduce the gas, and when the pipes for the accommodation are completed—there will be no dark corners for "lurking villains" to frequent, for our streets will be almost as brilliant as when the sun is at high meridian.[63]

New orders for gas light in 1825 increased beyond the capacity of the company to supply them nor could enough workmen be found to make the necessary installations in buildings. By September 3, 1825, the company, finding the consumer drain on its gas manufacturing capacity to be excessive, was obliged to issue an appeal asking consumers to "use it as sparingly as possible for a few evenings, . . . until the apparatus nearly completed for making an ample supply is in operation."[64]

As 1825 drew to a close the financial prospects for the New York Gas Light Company looked promising. The successful completion of gas facilities for the manufacture of gas and the turning on of the gas had brought an appreciation in the value of the company's stock. There was almost certain prospect, it was said, of "its proving the best

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[63] New York Mirror, April 9, 1825.

[64] Evening Post, November 10, 1825.

stock in the country."[65] In July of 1825 the Board of Directors announced a quarterly dividend of 3 per cent, payment to be made in November.[66] Meanwhile, potential producers of gas in other parts of the State were active. The New York Legislature issued charters for incorporation of gas light companies in Albany and Troy in March, 1825 and a charter for the Brooklyn Gas Light Company in April of 1825.[67]

The year 1825 had been a singular one, marking the beginning of a new era for New York. The city was unusually alive with signs of growth and progress. A magnificent parade was held on November 4, to celebrate the completion of the Erie Canal. On this occasion, the representatives of an older era as represented by tanners, curriers, skinners, tin plate workers and others, proudly marched under the banners of their societies in honor of the technological triumph which would shortly help to make them obsolescent.[68] A series of articles in the Nantucket Inquirer about conditions in New York City during 1824 contained the comment that matter contained no property which enterprising New Yorkers had not converted into a means of acquisition of wealth. The author

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[65] Ibid.,

[66] New York Gas Minutes, July 22, 1825, p.

[67] Evening Post, March 17, 1825, April 5, 1825.

[68] James Hardie, The Description of the City of New York... (New York: Samuel Marks, 1827), p. 142.

of the series described his reaction to the amazing feat of installing an underground system of pipes for the purpose of lighting the city with gas: "The agency of fire alone is made to impel vast burthens across the basis of its adverse element: solid substances risen from the earth's intestines are transmuted into luminous vapour, which is forced for miles underground through iron pipes and at intervals let out for nocturnal lights unto the gentiles."[69] Thus did 1825 mark not only a milestone in New York's greatness as a commercial city, but also in its role as a bold innovator of technical progress.

The New York Gas Light Company was making remarkable progress. Superintendent Dewey reported to the Board of Directors early in 1826 that a total of $186,000 had been spent in the previous year for the acquisition of property and extension of the gas works. Five additional benches of retorts were to be added which would bring about a substantial increase in gas making capacity by May 1826. The company had established its own brass foundry for the construction of gas

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[69] Nantucket Inquirer, January, 31, 1825. Quoted by Bayrd Still, "New York City in 1824: A Newly Discovered Description," New York Historical Society Quarterly, XLVI (April, 1962), 166. The series of articles uncovered by Still described conditions in New York during the summer and fall of 1824. They appeared under the editorship of Samuel Haynes Jenks in the Inquirer between December 27, 1824 and February 28, 1925.

fixtures and fittings, an operation which was intended to lessen dependence on British imports. Dewey was highly optimistic about this venture and forecast a profitable business in the supply of gas fixtures to other companies or manufacturing concerns anxious to manufacture and use gas on their own premises. Some orders for this type of gas apparatus had already been lodged with the company.[70]

By the end of 1825, after eleven months of operation, the company was supplying gas light to 588 houses and shops, where 3,122 burners (fixtures) were installed. Progress had been made despite the lack of inexperience which forced costs above the amounts estimated, and despite the continued existence of prejudice against the use of gas. "Still I am highly gratified that we have succeeded so well when we take into account every circumstance connected with a work so new and extensive"; Dewey wrote, "I cannot learn that any work in Europe has ever supplied as many Houses and Shops, and put up as many lights in so short a period as we have."[71] By the end of its first year of operation the New York company had many more consumers than the Baltimore Gas Light Company, established nine years earlier. The Boston Gas Light Company chartered in 1822 had yet to light its first gas lamp.

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[70] New York Gas Minutes, January 17, 1826, p. 33.

[71] Ibid.

CHAPTER VI

GAS LIGHT ADOPTED ON A WIDER SCALE

There were more than technical difficulties facing the new company. After the first inspection of gas meters in November, 1825, the bills sent to consumers aroused a storm of protest. Complaints were made that the charge of $1 per 100 cubic feet of gas was exorbitant, as were the charges for rental of gas fixtures (or burners). The average charge for such rentals were, according to the company, less than $35 for each house and shop supplied with gas, and this was as low as the average rate in Europe.[1] A meeting of gas consumers on November 11 declared that "peaceable measures" should be pursued to convince the company of the good intentions of the protestants and to press for a reduction in rates.[2]

Superintendent Dewey met with a consumers' committee to explain that a charge of 10 per cent above cost had been placed on the gas fixtures imported from England

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[1] Minutes of the New York Gas Light Company, p. 34 (January 17, 1826). MS in the files of the Consolidated Edison Company of New York; hereafter referred to as New York Gas Minutes.

[2] New York Evening Post, November 12, 1825.

to cover expected depreciation and other expenses.[3] The consumers were promised that the company would reduce gas rates as soon as possible. These explanations were unconvincing, and at a subsequent meeting of consumers it was reported that gas rates were 25 per cent higher than they should be, whereupon those present pledged to unite all those who used gas to force the company to lower its rates.[4] The public uproar forced the company to suspend collections. By December, 1825, its customers owed $25,000 to $35,000 (principally on fixtures and charges for fitting up commercial and private houses for gas).[5] Despite threats to do so, most consumers were reluctant to discontinue the use of gas. In January, 1826, Dewey reported to the Board of Directors that only two customers had discontinued service and an additional 20 were expected to follow suit.[6] Dewey suggested that the company issue a pamphlet to convince New Yorkers of the "justice and expediency of our charges."[7] The directors invited a consumers committee to meet with them to attempt a compromise

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[3] New York Evening Post, November 30, 1825.

[4] Ibid.

[5] "General Statement of the Funds, Effects and Expenditures of the New York Gas Light Company to 31st Dec. 1825." MS in the files of the Consolidated Edison Company; see also, New York Gas Minutes, pp. 33-35 (January 17, 1826).

[6] New York Gas Minutes, p. 34 (January 17, 1826).

[7] Ibid.

on the issues. As a result, gas rates remained unchanged, but rentals for fixtures were set at 12 1/2 per cent of the value of the fixtures, paid on a quarterly basis. Consumers were also to be allowed to purchase gas fixtures outright and so dispense with rental charges.[8] The difficulties involved in enforcing bill collections as a result of consumer protests convinced the directors of the need to establish by-laws and regulations to govern future relationships with their customers. The by-laws adopted in February, 1826, illustrate the problems connected with the private provision of a public service. They provided the following:

1) All gas furnished was to be paid for quarterly. This applied to charges for rental of fixtures and meters as well.

2) The company would take special steps to insure collections where bills were unpaid for a period of ten days or more.

3) The manager (i.e. Superintendent Dewey) might require "security" in all cases where he might judge it necessary.

4) The manager might refuse to supply gas to those houses which it was expected would be "removed or

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[8] New York Gas Minutes, pp. 35-36 (February 8, 1826). See also Pierson, "Origins Consolidated Gas," p. 84.

altered."

5) Consumers were to give adequate notice to the company's office of any escape of gas as "no deduction was to be made for leaks."

6) Argand burners were not to be used at any time without glass covers, and the gas jets or burners were to be kept as free from dust as possible. A strong bristle brush to clean the "holes when stopped" was advised.[9]

The by-laws also contained regulations governing the rental of gas meters. Rates depended on the number of "lights" or fixtures a meter was intended to serve. Charges for rental of a "10 light meter" were 44 cents per quarter; a 15 light meter and 30 light meter were rented at rates of 62 1/2 cents and $1.50 per quarter respectively. Rates for larger meters were not listed but were worked out in arrangements between the consumer and the company at a price proportionate to the cost of the meter.[10]

The decision to sell gas to consumers by the meter was, as we have pointed out, among the most practical of the suggestions offered by Dewey as a result of his European experience. Most English companies in 1825 and the Baltimore Gas Light Company in this country charged customers according to the estimated number of hours gas burners of a given size would be used. The task of policing consumers to

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[9] _Ibid_., p. 37.

[10] _Ibid_., p. 36.

see to it that gas was not used wastefully or beyond the stipulated hours was the responsibility of the company's "gas inspector." These men made their rounds every evening at an appointed hour to see to it that the gas lights were being extinguished according to contract. If lights were burning beyond the prescribed hours, the Inspector rapped an iron rod loudly on the sidewalk in front of the residence or against the door and, in a loud voice, issued the stern command "gas light out." The occupants inside scurried about as they quickly changed the light source from gas to oil and candles. Unnecessary delay meant a plunge into darkness, for the inspector's warning usually was followed by his shutting off the gas supply, by resort to a tap (or valve) attached to the service pipe in the street against the wall of the house.[11]

These methods were, however, often ineffective. Consumers wasted gas by burning it during daylight hours or by carelessly allowing the flame of the burner to attain a length longer than the recommended three inches.[12] Absence of a system of gas meters was held to have seriously retarded

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[11] Thomas Newbigging and W.T. Fewtrell (eds.), King's Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas, vol. III (London: William B. King, 1878), p. 1.

[12] Dean Chandler and A. Douglas Lacey, The Rise of the Gas Industry in Britain (London: British Gas Council, 1949), p. 65.

the progress of the Baltimore company. Revenue from the 70 customers and the municipality with which it began service in 1817 hardly sufficed to cover costs. The annual flat rate of $12 per burner made necessary by the absence of meters could only be afforded by the well-to-do. Those who would have used gas light if there had been an opportunity for cheaper use were thus unavailable as customers.[13]

The first attempt to measure gas by meter was made by Samuel Clegg, engineer of the Chartered Gas Light and Coke Company of London in 1815.[14] The basic principle involved was the construction of a chamber with drums half submerged in water which revolved as gas passed through the chamber. Each revolution was registered on an index or dial as a given quantity of gas. John Malam, an employee of the same company, produced a similar meter some years later but redesigned the floating chamber to give his meter greater accuracy. Malam received a gold medal from the British Society of Arts in 1819 against the bitter objections of Samuel Clegg.[15] A basic defect of Malam's meter was the loss of

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[13] Alfred Lief, Metering for America: 125 Years of the Gas Industry and American Meter Company (New York: Appleton-Century-Crofts, Inc., 1961), p.3.

[14] Thomas S. Peckston, A Practical Treatise on Gas-Lighting (London: Herbert Cheapside, 1841), p. 361.

[15] Chandler and Lacey, Gas Industry in Britain, p. 56.

pressure in gas mains due to impedance produced by the meter. Samuel Crosley, an associate of Samuel Clegg, improved on the Malam meter by widening the apertures for admission and emission of water and thus reducing internal friction.[16] Dewey had learned about the Crosley meter while on his fact-finding mission in England in 1824, and this he had ordered for the New York Gas Light Company.[17] Use of the improved meter was the technological "missing link" upon which the commercial success of the early gas companies was dependent.

The "wet meters" as they were called required that the water be maintained at a constant level to insure accuracy. Evaporation in hot weather made it necessary to constantly check and refill the meter. In cold weather the water froze and blocked the flow of gas. As a corrective, the gas company sold alcohol to its consumers at the rate of 25 cents a gallon, customarily bought by the dollar's worth. The water was diluted, according to instructions, to the consistency of a "stiff highball,"[18] in which state it was found useful not only for the relief of frozen meters but tired gas customers as well—a standard witticism of the day.

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[16] King's Treatise, III, 6.

[17] Pierson, "Origins Consolidated Gas," p. 81.

[18] Thomson King, Consolidated of Baltimore, 1816-1950 (Baltimore: Consolidated Gas, Electric Light and Power Company, 1950), p. 39.

The early bills and receipts of the New York Gas Light Company have nearly all been discarded or destroyed. The few that remain are valuable parts of the manuscript collection of various institutions.[19] Among these may be found the New York Gas Light Company's "Consumer's Ledger" of 1826,[20] which in its carefully hand written pages contains the names and the quantity of gas used by the company's first customers. The ledger has been described as a "social register" of the day, since among the families receiving gas light in 1825 and 1826 we find such prominent New York names as Van Buren, Vanderbilt, Howe, Van Wyck, Van Brunt, Conant, Wilmerding, Schiefflin, Westervelt, Post, Phyfe, Morton, Berrien and Van Riper.[21] The vast majority of the accounts listed were charged for the use of two or three gas burners (some consumers were charged for single burners). Many of the company's customers were merchants who lived over their places of business and may have taken advantage of the availability of gas to light their private apartments as well as their stores. The number of accounts that are

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[19] These early bills have been framed and are on display or stored in the files of the Consolidated Edison Company. See also files of the New York Historical Society.

[20] New York Gas Light Company. "Consumer's Ledger 1826," MS in the files of the Consolidated Edison Company.

[21] "New York's Pioneer Users of Gas," Gas Logic, vol. XLVII (June, 1930), pp. 8-9.

clearly distinguishable as being either commercial or residential are approximately equal, thus indicating that gas was used to light private homes in this early period.[22] The primitive state of American gas purification methods and the resulting odors would lead one to conclude that the ratio of private to commercial users would probably have declined over the decade to follow, especially when alternative methods of lighting became available.[23] At any rate, the expensiveness of gas lighting limited its use for domestic lighting to the more affluent portions of the population. This trend was finally reversed after the Civil War when changes in gas rates and pricing policies reduced costs so as to make gas light available on a broader scale.

The consumer's ledger of 1826 revealed that the largest institutional users of gas at the time were the theaters of New York, a development little foreseen but of great importance in a community where nearly all classes of the population were theater-goers. The first theater in New York to attempt illumination by gas did so, in fact, before the establishment of a New York gas company. On October 21, 1821, the Park Theater tried gas light on an experimental basis. Following the practice used by theaters

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[22] Pierson, "Origins Consolidated Gas," pp. 89-90.

[23] See chapter VIII below.

in England, a small gas producing plant was set up on the premises; the light yielded was described as "very satisfactory" and "whiter than that of oil and more brilliant."[24] The experiment was shortly discontinued and no further mention of gas in connection with the theater in the city is heard of until the New York Gas Light Company began its operation in 1825.

On May 9, 1825 the Chatham Theater, splendidly redecorated with "soft carpets and oil cloths," opened its second season with the illumination of the entire theater by gas. According to the New York Mirror, the gas lights "shed a clear soft light over audience and stage, and gave a very brilliant appearance to the close multitude of ladies and gentlemen who filled the boxes to overflowing."[25]

The customer accounts of the New York Gas Light Company for 1826 show that the Chatham Theater used some 60 or 70 fixtures for the lighting of the interior and that, during the theater season, some five to six thousand cubic feet of gas were consumed each week. At the going rate of $1.00 per hundred cubic feet, the theater's gas bill ranged from $50 to $60 per week.[26] This was an item of great expense with which the New York theaters often found themselves unable to cope. The minutes of the New York Gas

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[24] New York Evening Post, October 1, 1821.

[25] New York Mirror, May 14, 1825.

[26] New York Gas Light Company, "Consumer's Ledger, 1826," p. 218.

Light Company for this period record the frequent difficulties between the company and the theater owners over the accumulation of large unpaid gas bills.[27] The Bowery Theater, which adopted gas lighting in the fall of 1826, has left records which yield further information on the problem of costs. During the season of 1830-31 (gas was now priced at 70 cents per hundred cubic feet) the theater spent from $82 to $116 per week for gas. In addition there were the considerable charges for the rental of fixtures and meters.[28]

In the summer of 1826, the Lafayette became the second New York theater to adopt gas lighting. The production of El Hyder was enlivened with an elaborate scenic display on an enlarged stage which, according to the advertisement, would for the first time be "brilliantly lighted with gas, displaying an extent of stage and capabilities for the production of Equestrian Melodrama wholly unrivalled in this country."[29] That same summer, when the Park Theater engaged

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[27] New York Gas Minutes, p. 51 (February 20, 1827), p. 52 (March 17, 1827), p. 54 (May 21, 1827), p. 58 (July 16, 1827).

[28] Theodore Shank, Jr., "The Bowery Theater, 1826-1836," (Unpublished doctoral dissertation, Stanford University, 1956, in the files of the New York Public Library, Lincoln Center Branch), p. 23.

[29] George C. Odell, Annals of the New York Stage, vol. III (New York: Columbia University Press, 1928), p. 218.

in a program of extensive alterations, no provision was made for the use of gas. This prompted an article in the press which urged the proprietors to reconsider: "it is much to be wished that for their cracked and dingy oil lamps, they would substitute the brilliant, pure and ethereal gas-lights. . . . There may be some objections to the use of gas in a theatre, of which we are ignorant; the Lafayette, however, is lighted with it and we have never heard of its occasioning any difficulty or inconvenience."[30] Although the advice given was ignored on this occasion, the Park Theater adopted gas lighting a year later.[31]

On October 23, 1826 the grand opening of the historic Bowery Theater significantly affected the further spread of gas lighting in several important aspects. First known as the New York Theater and then several years later simply as the Bowery Theater, it was located at the very beginning of the Bowery along the northern edge of Chatham Square. Here in the heart of the city on the site of a former cattle market, a group of wealthy New Yorkers planned a theater which would be the most elegant in New York.[32] Facilities for the use

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[30] New York Evening Post, August 8, 1826.

[31] Odell, New York Stage, III, 307.

[32] Arthur Hornblow, A History of the Theater in America: from Its Beginnings to the Present Time, vol. II (Philadelphia: J.B. Lippincott and Company, 1919), pp. 25-26.

of gas lighting were incorporated in the plans of construction.[33] The gas jets were to be enclosed by ground glass which diffused the light and shielded the eye from the naked flame.[34] The Bowery Theater opened on October 23, 1826 and the audience hailed with great satisfaction the use of gas to light the stage.[35] What was new on this occasion was not the use of gas (contrary to the mistaken opinion of theater critic, Joseph N. Ireland) but the enclosure of gas jets within glass shades made of ground glass. One observer delightedly exclaimed; "sit where you will, you will never be annoyed by an offensive glare of light."[36] Thus was reported the first use of diffused lighting by gas.[37] The Bowery's gas lamps and fixtures effected another important improvement; they provided enough light for the spectators to see one another. As early as 1824, editors of the New York Mirror, having in mind perhaps the superior lighting of London's

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[33] Shanks, "Bowery Theater," p. 23.

[34] Odell, New York Stage, III, 256; and The Oxford Companion to the Theater, ed. by Phyllis Hart Knoll (London: Oxford University Press, 1967), third edition, pp. 121-122.

[35] Joseph N. Ireland, Records of the New York Stage from 1750 to 1860, vol. I (New York: T.H. Morrell, 1866), p. 522.

[36] New York American, October 29, 1826; New York Evening Post, November 13, 1826; New York Mirror, October 28, 1826.

[37] Odell, New York Stage, III 256.

theaters, had complained: "There is too much light on the stage and too little in the boxes. It would be difficult to recognize a friend across the house."[38] On another occasion, the editors of the same paper declared increased light an absolute necessity for the theater's female patrons: "What is the use of spending two hours at the toilet if no one can perceive the improvement . . . the boxes are too dark . . . . Unless the managers correct this evil we would suggest that every lady like the ancient vestals of the East bring her lamp."[39]

The new gas fixtures in the Bowery Theater remedied this defect because in addition to lighting by central chandeliers, the same gas lights shielded by gound glass were installed as side lights around the walls of the theater and in the boxes themselves. The audience not only found the softened lights pleasurable but those in the upper balconies were given a clearer view of the stage as the huge accumulation of candles and oil lamps which were part of the old type chandeliers gave way to the more compact fixtures of gas lights. A comment made in the summer of 1825, concerning improvements in the Chatham Theater's gas lighting, was applicable to the new lighting system of the Bowery in 1826:

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[38] May 22, 1824.

[39] New York Mirror, June 19, 1824.

"The throng of beauty and fashion which nightly crowd its boxes, and the charming faces of the beau monde, never show to more advantage than in the soft clear radiance of the gas lights."[40]

The Bowery's use of gas lighting in the fall of 1826 had demonstrated beyond all doubt the importance of gas for the life of the theater. As the use of gas increased, the art and technique of the theater were profoundly altered. An authority on the English theater in discussing the changes in scenery and costumes in England for the period 1817 to 1837 remarked that the introduction of gas was the most important single event to be noted.[41] This was no less true for the stage in New York, once gas light was introduced. The effect of gas lighting upon the art of the scene painter and the stage manager proved to be as revolutionary as the introduction of electricity three quarters of a century later.[42] A serious problem created by the use of candles and oil lamps of the earlier theater had been their tendency to emit smoke after extended use. Whenever this happened, the wick had to be trimmed. It was not unusual to find that in the midst of tense and action-filled scenes the "snuff boy"

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[40] Ibid., June 4, 1825.

[41] George C. Odell, Shakespeare: from Betterton to Irving, vol. II (New York: Benjamin Bloom, Inc., 1920), p.157.

[42] Ibid.

would have to be called out to perform his highly specialized task. A deft and clever performance by the young lad would elicit high applause which, unfortunately, was bound to have an adverse effect on actors struggling with heavy drama.[43] A second problem in the pre-gas light era was the inadequacy of light. Despite heavily laden chandeliers of candles, the intensity of light was low. Reflectors were sometimes placed behind candles to cast a beam of light. Such a light was called a "focus" and actors moved into the focus or toward lighted areas to be seen while they spoke their lines. Thus when a well known American actor, Edmund Kean, was being congratulated for the realism with which he as Othello was choking Iago, the actor replied "I should think so! Hang the fellow, he was trying to keep me out of the focus!"[44] Gas lighting removed the primitive technique of the "focus" and was responsible in this instance, at least, for creating greater harmony among actors and entertainers.

The ability to control lighting from a central point was another important advance provided by gas, in theatrical productions. The illusion of night or day in the theater had

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[43] William T. O'Dea, The Social History of Lighting (London: Routledge and Kegan Paul, 1958), pp. 159-160; Theodore Fuchs, Stage Lighting (Boston: Little Brown and Company, 1929), p. 28.

[44] Ruth Crosby Dimmick, Our Theaters, Today and Yesterday (New York: The H.K. Fly Company, 1913), p. 28.

formerly been produced by raising or lowering large bulky chandeliers. Some theaters employed a device which could be lowered over the chandelier to create the same effect. These results were generally unsatisfactory as the intensity of light emitted by candles remained constant and could be used with only limited effect. Gas jets, however, were controlled from a central tap or valve. By increasing or decreasing the quantity of gas, the intensity of light could be varied and it did not take long for stage managers and their assistants to develop a whole variety of devices and effects based on this principle. By the end of the nineteenth century, there were veterans of the art of stage effects who rated gas lighting as superior to electricity for this purpose.

Early forms of gas lighting for the stage had their disadvantages as well. When occasionally a complete blackout of the stage was required, this would mean a complete stoppage of the flow of gas. In order to relight the theatre, each individual gas jet had to have a flame applied to it and in the process a considerable amount of gas was released causing for the moment odors unpleasant to the audience. Nevertheless, the striving for realism was a potent force, and even under these conditions directors often ordered a change in lighting from "full on" to "dark out" while attempting to devise methods to lessen odors and the risks of fire.[45]

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[45] Ward Leonard Electric Company, Theatre Lighting: Past and Present (Mount Vernon, New York: By the Company, 1923), p. 16.

The greater visibility provided once gaslight was available led to changes in styles of acting. The exaggerated gestures, loud voices, and distorted faces that were a necessity on a dimly lit stage became conspicuous and odd when the lights were turned up with gas. Increased light forced "the old actor to curb himself, gesture became more and more 'natural' dwindling till it ceased altogether; no more faces were made, and the art of suppression took the place of expression; reserved force was the thing."[46]

Now, also, the entire stage area could be used. Exits and entrances could be made at many points. Actors no longer arrived at their places in important scenes under cover of darkness as if by stealth.[47] Scenic backgrounds assumed an importance which had been impossible in the poorly lit theater of the past. They became a vital part of the play and its action. When the Park Theater introduced gas lighting in the fall of 1827, the advertisement for the occasion read: "To give greater effect to the scenery . . . the stage has been fitted up for lighting by Gas."[48] The physical appearance of theaters was altered. They increased in

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[46] John Balance, "Foreword to an article by Wilkie Collins on "The air and the audience: Considerations on the armospheric influences of theaters," *The Mask*, X (1924), 164.

[47] *Ibid.*

[48] Odell, *New York Stage*, III, 307.

height as improved lighting made it possible to add more balconies. The proscenium arch was widened and its outer surface was decorated with heavy ornamentation to conceal the rising and twining gas pipes. Action retreated from the apron up front to the rear of the stage thus allowing larger numbers of actors to be on stage at the same time, a necessity for the spectaculars of the day.[49]

Progress had its negative aspect. If control from a central point eased the tasks of stage directors, it also made the theater vulnerable to the pranks of practical jokesters. A simple twist of the main valve could plunge a theater into darkness, the relighting of which, as indicated earlier, was a difficult task. Several dismaying experiences were suffered before theaters learned to set security guards over gas valves.[50]

Sometimes the gas blackouts which occurred were caused by malfunctioning of the equipment at the gas works. This would seem to have been the nature of the catastrophe which befell the Chatham Theater during the presentation of the popular melodrama, Tom and Jerry, in September, 1825. Soon after the play had begun the theater was plunged into total darkness. Actors and audience were thrown into

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[49] John Mason Brown, "The Tenterhooks of Temptation," Theatre Arts Monthly, IX (July 1925), 438.

[50] Shanks, "Bowery Theater," pp. 23-24.

confusion. Mr. Wallack, the Corinthian, stepped forward in response to the cues for light and announced that he had dispatched a messenger to the gas light company to learn the source of the difficulty. He begged the audience to be patient. Sperm candles were brought out from the wings and given to various spectators in the boxes to hold until they could be better secured. The play was resumed and after an hour had passed, the flow of gas was again resumed. In describing the event, a newspaper account declared: "Everything was conducted good naturedly and we doubt if during the season so much merriment has been excited as the failure of gas on Friday evening."[51]

Simultaneously with the introduction of gas into theaters occurred the adoption of the new illuminant for the "pleasure garden," one of New York's most popular forms of public amusement. Pleasure gardens were an imitation of an English institution going back as far as the 16th century. Famous London gardens, such as the Vauxhall, the Ranelagh and Sadler's Wells were recreated in name, style and structure in New York City during the early decades of the nineteenth century.[52] Here city dwellers could

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[51] Boston Patriot, September 21, 1825.

[52] Harold Donaldson Eberlein and Cortlandt Van Dyke Hubbard, "The American Vauxhall of the Federal Era," Pennsylvania Magazine of History and Biography, LXVIII (April, 1944), 150-151.

"promenade" amid leafy bowers, obtain light or heavy refreshment and receive some sort of "thrill." Music by string bands, exhibitions, fireworks, floor-shows, and an occasional balloon ascension provided an evening's exitement. Many of the gardens contained pavilions where plays might be given and to which New York's regular theatrical companies retreated during the summer. The gardens in the city proper were usually inclosed by a wooden fence or palisade providing privacy for those who frequented the arbors and grottoes or sauntered along secluded walks.[53] Gas light was used to maximum advantage under such conditions, the open areas dissipating the odors and heat which were complained about indoors.

The first of New York's pleasure gardens to install gaslight was the famed Castle Garden. Built on a small reef or patch of land one hundred yards off the southern shore of Manhattan and directly facing the promenade on the Battery, Castle Garden was especially popular because of the cooling breezes which swept in from surrounding waters. In 1822 the federal government had ceded the land to New York City which, in turn, leased it several years later to a group of New Yorkers anxious to use it as a place of public entertainment. A wooden walk connected the Garden to the mainland and it was here in the summer of 1824 that the

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[53] Ibid.

Revolutionary war hero, the Marquis de Lafayette, first landed during his memorable visit to New York City.[54]

During the fall of 1824 the New York Gas Light Company laid its gas mains from Grand Street to the Battery; and shortly thereafter, gas illumination provided one of the "thrills" of this garden. Little more than a week after the lighting of the Chatham Theatre by gas in 1825, the proprietors of Castle Garden advertised on May 20, 1825, that gas light would be inaugurated that evening: "There will be from four to five hundred jets of light attended with a first rate Band of Music."[55] This, it must be admitted, was the second feature attraction in a program which starred a "Great Boat Race" for a purse of $2,000 which was to begin at Robins Reef in the Hudson and end in front of a "staked boat" anchored directly opposite the Garden.[56] But there was nothing to compete with the attraction of gas lighting on the following evening and for many nights thereafter. A European visitor to Castle Garden at this time described the display of gas lighting as a "tasteful illumination."[57]

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[54] Rodman Gilder, The Battery (Boston: Houghton, Mifflin Company, 1936), p. 147.

[55] New York Gazette and General Advertiser, May 20, 1825.

[56] Ibid.

[57] Gilder, The Battery, 147.

In June of 1826, gas light was introduced at Vauxhall Garden, situated in the Bowery Road about two miles from City Hall,[58] then in the northern suburbs of New York City. According to the announcement in the press, "the Gas will be given by Dr. Preston immediately in front of the elevated seats. . . . A Band will play . . . fireworks to be set off."[59] The introduction of gas into Niblo's Garden in 1828 saw the first use of gas lighting as an advertising medium. Niblo's was located at Broadway and Prince Street. On the occasion of the opening of a theater, built on the grounds and called the "Sans Souci," the proprietor encased his gas lights in colored "glass cups" which caused NIBLO to be spelled out in large red, white and blue letters.[60] Niblo's patriotic display was the talk of the town in the summer of 1828, and it is apparently one of the inexhaustible and mystical sources held responsible for bestowal of the title "Great White Way" on New York's most popular thoroughfare.[61]

Gas illumination also made New York's museums of the day more available. Despite a similarity in name, these were

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[58] The Picture of New York and Stranger's Guide to the Commercial Metropolis of the United States (New York: A.T. Goodrich, 1828), p. 387.

[59] New York Enquirer, July 13, 1826.

[60] Robert Shackleton, The Book of New York (Philadelphia: The Penn Publishing Company, 1928), p. 223.

[61] "The First New York Theatre to Use Gas," Gas Logic, XXV (February, 1919), 5.

a far cry from the museum as we know it today. They were privately owned and operated and faced sharp business competition from rival establishments. The more important museums were open afternoon and evenings and charged admission fees to cover costs and to make profits. In addition to exhibits termed "natural history," the museums sought to entice visitors with collections of oddities, bands, entertainment and lectures. The central place which they held in the life of the city may be illustrated by reference to statements appearing in the New York press during the spring of 1827. This was a year in which the annual meetings of the Quakers and the popular horse racing events brought unusual numbers of visitors to the city. The newspapers issued a list of places of interest to the visitors, the majority of which were museums in the city. The list included the American Academy of Art, Brower's Gallery of Busts, Scudder and Peale's museum. Spectaculum in Chatham Street, Athenaeum, City Library, Automatic Chess Players, Sea Serpent, Dwarf and Wonderful Ox.[62]

Most important of New York's museums was Scudder's Museum which had been founded by John Scudder in 1810 as the American Museum. It was housed in the New York Institution, a building accommodating a variety of learned societies

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[62] Charles H. Haswell, Reminiscences of an Octogenarian of the City of New York 1816 to 1860 (New York: Harper and Brothers, 1896), pp. 218-219.

within the grounds of City Hall Park.[63] In September, 1825, the museum applied to the Common Council for permission to open the streets from Broadway to the museum grounds for the installation of a gas pipe. Permission was granted;[64] and on January 13, 1826 the public was informed in the press that a program of extensive alterations and improvements had been completed and that the museum "would be brilliantly lighted with gas in the evening. The rooms are comfortably warmed." Here gas was being used to provide heat as well as light.[65] From a guide book of the day, we learn that the facilities being lighted with gas included five large halls, each 100 feet in length.[66] Scudder also planned a new kind of museum during this period which he named the Spectaculum. Located in the heart of the city on Chatham Square, its uniqueness lay in that it avoided the usual emphasis on natural history and exhibits of educational value, but declared instead that it would merely present such objects which have a tendency to "please."[67] Opening in the summer of 1826, the

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[63] Picture of New York, p. 440.

[64] New York City, Minutes of the Common Council 1784=1831, vol. XIV, p. 767. Hereafter referred to as NYMCC.

[65] New York Evening Post.

[66] James Hardie, The Description of the City of New York (New York: Samuel Marks, 1827), p. 343.

[67] New York Evening Post, May 13, 1825.

Spectaculum featured a "collection of natural and artificial curiosities of every description," featuring, once again, three halls "brilliantly lit with gas."[68] Gas lighting was thus another marvel on display and its use in this manner by theaters, pleasure gardens, and museums helped to expand its popularity in the first years of its existence, and to enhance the entertainment appeal of the city.

As far as the use of gas for public street lights was concerned, the Common Council remained conspicuously silent. The franchise agreement of May 12, 1823 between the Corporation and the gas company had contained a clause setting May, 1825, as a deadline within which preparations should be completed for the lighting of Broadway from the Battery to Grand Street. Yet when on May 9, 1825 the secretary of the company asked Alderman Cowdry to inform the Common Council that the company was ready to begin supplying gas to the public lamps,[69] the council took no action.[70] The city showed little disposition to assume the financial burdens which would be required by the conversion of oil lamps to gas. The silence and inactivity of the council did not pass unnoticed. The New York Mirror in the spring of 1825 dropped a broad hint: "A contract has been concluded

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[68] New York Enquirer, July 26, 1826.

[69] Notice to the Common Council [of New York City] to be presented by Alderman Cowdry on May 11, 1825. MS in the files of the Consolidated Edison Company.

[70] NYMCC, XIV, 517.

to light the whole city of Dublin with gas by the 26th of September next. When shall the city of New York enjoy the same advantage?"[71] Rumors circulated in the city that summer that the gas company and the council had reached agreement on the terms for lighting the city with gas.[72] But these proved ill founded as weeks and months passed by without a public announcement.

The winter of 1825 saw the occurrence of an incident which marred the relations between the city and the gas company. Requests for gas light for private use had been sent to the company from the area north of Grand Street which was of course outside the gas district as defined by the franchise of 1823. Superintendent Dewey had written to the council asking for permission to satisfy these requests, seeking to have accepted the general principle that the company would have the right to extend its gas mains to any street in which at least twelve inhabitants expressed a desire to be served with gas light.[73] The council did not get around to consideration of Dewey's proposal until a month later, when the company had already gone ahead to lay gas pipes in the region north of

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[71] May 21, 1825.

[72] New York Gazette and General Advertiser, August 9; 1825; New York Evening Post, August 9, 1825.

[73] NYMCC, XV, 20.

Grand Street.

The Finance Committee reporting on the matter of extending the company's mains, expressed indignation and irritation when it stated they had learned "with surprise that the company had ventured, without the authority of this Board to lay their pipes in one or two streets north of Grand Street," and that they were "gratified to understand that the Street Commissioner of this Board promptly ordered the Company to desist."[74] The Common Council asked the street commissioner promptly to notify the gas light company to "take up and remove all the Gas Pipes, which they have laid in any streets beyond the limits of their contract with this board."[75]

The company moved quickly to make amends for a lapse in judgment due to Superintendent Dewey's eagerness to acquire new customers in the vicinity of the gas works. It should be remembered that the company had built its works on the northern edge of its gas district; hence, supplying the area immediately north of Grand Street would have been most convenient. On December 23, the council was read a letter from the company promising to remove all pipes laid in the disputed area, though it was pointed out that breaking up the streets and removing the pipes could not be

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[74] *Ibid.*, XV, 20.

[75] *Ibid.*

effected in cold weather but would have to wait until spring.[76] Meanwhile, the supply of gas to inhabitants north of Grand Street was to be immediately discontinued. Superintendent Dewey contended that he had earlier informed the street commissioner of his plan to lay pipes north of Grand Street and that failing to receive any objection, he had felt justified in extending the mains.[77]

Removal of the mains by the company was a decided inconvenience to New Yorkers north of Grand Street. A petition by the affected citizens in the spring of 1826 was ignored by the Common Council.[78] Almost a decade was to elapse before gas light would be supplied to this part of the city. Opposition to extension of the New York company's mains was based on agitation among gas consumers and growing public hostility to the company. It was now evident that gas franchises conferred valuable rights and council members were determined that grant of these rights and privileges should be accompanied with greater benefits to the municipality. These feelings emerged sharply during the discussions and debates attendant on the efforts to form a

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[76] Ibid., p. 120.

[77] Copy of letter to the corporation, December, 1825, from the Board of Directors of the New York Gas Light Company. In the files of the Consolidated Edison Company.

[78] NYMCC, XV, 352.

rival gas company in the city—a process which began almost as soon as the New York Gas Light Company had commenced operations in 1825.[79]

In February, 1826, after more than eight months of waiting for a council decision on the use of gas for the public lamps, the company sought to use gentle persuasion in order to induce a reply. The company offered to light the chamber of the Common Council with gas at no charge to the city.[80] The council responded to this generous offer with the appointment of a Special Committee to investigate the expense involved in the conversion of the public lamps from oil to gas light.[81] The committee completed its report by June of 1826 but the council showed no inclination to act upon it.[82] In July and August, attempts to open discussion failed.[83] In September, the original committee was expanded to include the members of the Law Committee and the Counsel of the Corporation.[84] It was not until October, 1826, a month later and 18 months after the original request had been made, that the Common Council began serious discussion of the plan to light the streets of New York City with gas.[85] The

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[79] See chapter VII below.

[80] New York Gas Minutes, p. 38 (February 8, 1826).

[81] NYMCC, XV, 211.

[82] *Ibid.*, p. 492.

[83] *Ibid.*, pp. 551, 561, 613.

[84] *Ibid.*, p. 621.

[85] *Ibid.*

delay did not necessarily mean inaction but developed because of protracted discussions between the city and the gas company over the rates to be charged for the supply of gas to the public lamps. The difficulty arose over a clause inserted into the franchise agreement of 1823 which read that the company would light the public lamps with gas "at a Yearly Expence to the Corporation not exceeding what would be the expence of lighting and supplying the said lamps with Oil . . . [and] estimating the price of oil at the average rates of the preceding year."[86]

The council's Special Committee on Gas Light had attempted to get from the company agreement on a specific price for gas independent of the cost of oil. The price of oil had shown an increase of 55 per cent between 1824 and 1825 (from 45 1/2 cents to 70 1/2 cents)[87] and lighting costs had risen rapidly in the city as a result. Superintendent Dewey replying for the company insisted that were it not for the terms of the franchise agreement basing the cost of gas light on oil, the company would not agree to light the public lamps for less than $15 per year—a rate more than double the price based on oil. Dewey supported his

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[86] Ibid., XIII, 61 (May 12, 1823).

[87] Alexander Starbuck, History of the American Whale Fishery: from its earliest inception to the year 1876 (New York: Reprinted from Argosy, 1878), p. 660.

arguments with the example of Liverpool in England where a contract signed in January, 1825 between the town and the gas company provided for payment of more than $21 per year for each public lamp supplied with gas.[88]

The costs of installing gas lamp posts presented an additional problem. The lighting district being converted from oil to gas contained 1,849 lamps but they were considered to be too far apart for proper lighting even with the use of gas. Their number was to be increased to 2,400 which would then allow the posts to be placed 100 to 160 feet apart according to the varying needs of the locality. The committee reported that in London and Liverpool, the posts were placed 60 to 90 feet apart according to the width of the street. "It is believed, however, that in our atmosphere the streets will be sufficiently lighted if the posts are placed 100 feet apart in those streets not wider than Broadway."[89] It was estimated that each iron lamp post to be erected would cost about $20. The cost of erecting 2,400 posts would thus bring the bill for converting the entire lighting district to gas to a total of $48,000. The 1,849 oil lamp posts to be displaced were estimated to have a value of $7 per post (a new post cost $9.62) and a saving of $12,943 could be effected by using the uprooted oil posts

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[88] NYMCC, XV, 661-662.

[89] Ibid., p. 90.

in other portions of the city. Additional savings might be made if some gas lamps were placed on brackets to be attached to the sides of houses instead of being placed on lamp posts.[90] But even the net cost of lighting the entire district after savings ($37,057) was considered by many aldermen as too large a sum for what was still believed to be, at best, an experiment.

The committee proposed, therefore, a more modest expedient: that the sum of $2,000 be expended for the lighting of Broadway by gas as a means of testing "the value of Gas light before the whole contract is entered into." Such a sum would be "small indeed, compared to the Advantage and comfort to be derived from having that elegant street properly lighted and the utility of gas properly tested."[91] Proponents argued that gas was preferable to oil, since "it is extremely difficult to procure Oil that will burn in our Street Lamps in the most intense weather," and they contended that the citizens were of "one voice" on the "necessity of having our streets better lighted. . . . Comfort and convenience, and the preservation of peace in the night requires that it should be done."[92]

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[90] Ibid.

[91] Ibid., p. 666.

[92] Ibid.

Before voting to adopt the report of the Special Committee on Gas Light, the council listened to a report from its Law Committee and the Corporation Counsel which declared, in answer to a question that had been raised, that the proposed contract for gas lights would in no manner "bind the Corporation of this City to receive the Gas light for any greater length of time than they may require nor to any further extent of the City."[93]

Having thus established the temporary and provisional nature of the lighting contract, the Common Council voted 13 to 7 in favor of the Special Committee's recommendations. At least one of the aldermen voting in favor did so on the basis of the statement contained in the committee's report which declared that the agreement to use gas "could be discontinued at the pleasure of the board."[94] The doubts persisting in this matter, however, were not laid to rest until they Special Committee, shortly after entering in a contract with the gas company, obtained a written statement from the latter affirming the city's right to withdraw, should it wish to do so, from further use of gas light.[95]

At the next council meeting, on November 6, 1826, the opponents of gas lighting continued to raise objections.

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[93] _Ibid._, 667.

[94] _New York American_, October 31, 1826.

[95] _NYMCC_, XV, 29.

An attempt on their part to have the vote of the previous meeting reconsidered was put down. A proposal to use wooden instead of iron supports for the lamp posts was similarly defeated. Some slight victory was achieved by the opposition in limiting the experiment when a motion passed which Directed the Special Committee on Gas Light "not to expend more than two thousand dollars in introducing the Gas light into Broadway."[96]

Broadway was chosen as the site of the city's first venture into street lighting by gas because it was New York's most important and most elegant thoroughfare in 1826. It occupied the high ground between the Hudson and the East ivers, moving in a straight line from the Battery to 10th Street, after which it curved slightly westward and continued on to the city limits on 13th Street. Eighty feet wide, it was one of the great north-south roads along which the city was to progress during the 19th century. Samuel S. Griscom, of Philadelphia, who visited the city in 1824, said of Broadway that it was more like some of the finer streets of his native city than any he had seen.[97] Immediately below City Hall and west of Broadway were found some of the most fashionable

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[96] *Ibid.*, p. 684.

[97] "Appearance, buildings and institutions of New York City in 1824," p. 39. MS in the files of the New York Historical Society.

residences in the city. The streets east of Broadway, and especially in the vicinity of the East River docks were taken up with the homes of the poor and the immigrants. Broadway was the seam along which the city's population was sorted out.[98]

The dominant architectural feature seemed to be row on row of three-story buildings (with occasionally a fourth story facing the front through a dormer window) which were freely constructed by carpenters, masons and craftsmen as copies of successful designs.[99] When some New Yorkers began to erect buildings on Broadway several inches higher than the one next door, the practice was criticized as ugly and absurd. Instead, the desire for uniformity in height and appearance was voiced in order to achieve an effect which was said to have given Philadelphia its air of distinction.[100] Some parts of Broadway were lined with tall stately poplar trees and with patches of shrubbery and shade trees marking the location of pleasure gardens. Although the street was predominantly residential, it also contained many of the city's finest shops. Some shopkeepers used a framework of wooden

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[98] Robert Ernst, Immigrant Life in New York City 1825-1863 (New York: King's Crown Press, 1949), p. 39.

[99] Ada Louise Huxtable, Classic New York: Georgian Gentility to Greek Elegance (New York: Anchor Books, 1964) p. 44.

[100] New York Evening Post, March 12, 1828.

poles in front of their shops on which to stretch taught canvas blinds to shield pedestrians from the sun.[101] Now, in the spring of 1827, 120 iron lamp posts were erected on Broadway from the Battery to Grand Street. In June, these lamps were lit for the first time, and Broadway shone with unaccustomed brilliance.[102] A new era in the history of this famous street commenced. It had always been busy during daylight hours but great crowds of pleasure seekers now appeared in the evening as well.[103] Even before the advent of the gas street lamp, the merchants on Broadway had begun the introduction of gas lighting into their stores. The combined effect of the illumination of streets and stores on Broadway was described as forming "one of the principal modern improvements."[104] New York began to assume a "cosmopolitan" air. When Mrs. Frances Trollope visited the city in 1829, she remarked: "At night the shops which are open till very late are brilliantly illumined with gas, and all the population seem as much alive as in London or Paris. This makes the solemn stillness of the evening hours in

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[101] Picture of New York in 1828, p. 460.

[102] Haswell, Reminiscences, p. 220.

[103] David Thomas Valentine, ed., Manual of the Corporation of the City of New York, 1865 (New York, 1865)p.509.

[104] Picture of New York in 1828, p. 421.

Philadelphia still more remarkable."[105]

The successful lighting of Broadway led to requests and petitions addressed to the Special Committee for the construction of gas lamps on other streets of the city. Chatham Street, Pearl Street and the Bowery were among the earliest of such streets requested to be lighted with gas. Some 40 lamps were to be erected on Chatham and Pearl streets in the vicinity of City Hall.[106] Gas lamps were ordered for the gates of City Hall Park and a "platform" in front of City Hall in August 1828.[107] A resolution to light Wall Street with gas was passed in November.[108] Other streets soon followed. The annual cost for the supply of gas to a street lamp in 1828 was given as $8.[109]

As the decade of the 1820's drew to a close, the progress in the installation of street lamps slowed and practically halted. The first year for which such statistics are available, 1827, show that the city's streets were lighted by a total of 3,142 oil lamps (in addition to the 120 gas lamps on Broadway).[110] The next year for which such data

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[105] Domestic Manners of the Americans (New York: Vintage Books, 1960), p. 352.

[106] NYMCC, XVII, 30-31.

[107] Ibid., 331.

[108] Ibid., 469.

[109] Ibid., 31.

[110] I.N.P. Stokes, The Iconography of Manhattan Island, 1498-1909 (New York: R.H. Dodd, 1915-28), vol. V, p. 1667.

are available 1835, show the total to be 5,660 street lamps which included 384 gas lamps.[111] The total increase in gas lamps for a period of 8 years is thus given as 264, an unsubstantial amount. Difficulties had arisen between the city and the gas company which caused the latter to lose interest in the onerous and unprofitable task of providing gas for the public street lamps.

The success and stability of the New York Gas Light Company were, as the 1820's drew to a close, becoming undeniable facts. By the end of its first year of operation, 1825, a 3 per cent dividend had been declared. In the following year, dividends totaled 12 per cent. They were 9 per cent in 1827 and 12 per cent in 1828 and 1829. By December 31, 1829, net profits for the manufacture and distribution of illuminating gas amounted to $152,000, and surprisingly enough an almost equally large amount, $112,000, was earned as net profits on the sale and rental of lighting fixtures, gas meters and miscellaneous services. Between 1826 and 1829 (after approximately four years of operation) the company's investors had realized a return of almost 50 per cent on capital invested.[112]

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[111] Documents of the Board of Assistant Aldermen, vol. I, Doc. No. 45, pp. 505,506.

[112] New York State Senate, Report of Special Committee to Investigate Lighting Companies, Senate Doc. No. 47, March 1, 1886, pp. 695, 697. Figures used have been rounded off to the nearest thousand.

The New York Gas Light Company had set an example of careful planning and execution in the introduction of a major new technology into the life of the city. Starting with the decision to obtain first hand and accurate information about British and European developments and concluding with the long and difficult negotiations over the supply of gas for the public lamps, the company had moved forward without major mishap. True, it was still wedded, in 1827, to a system of gas manufacture based on rosin in contrast to British reliance on coal, but there was at the moment little cause for concern. It remained the only New York company and it sought to deal with consumer complaints by lowering gas rates from the original $1 per 100 cubic feet to 90¢ in 1828 and to 80¢ in 1829.[113] These measures, however, were unsuccessful in preventing the rise of activities among New York's investors and consumers designed to challenge the supremacy of the New York company through legislation at Albany.

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[113] See Appendix A. The New York Gas Light Company abandoned rosin gas in favor of coal gas after 1849. See pp. 267-68 above.

CHAPTER VII

A RIVAL COMPANY IS FORMED

New York City gas consumers found the cost of gas light burdensome because in addition to the price paid for each 100 cubic feet of gas used, there were, as stated earlier, additional charges each quarter for the rental of gas fixtures and gas meters. In April, 1827, an attempt was made to have the state legislature regulate the sale of gas by law. Petitions by the gas consumers of New York City were presented to the assembly with the comment that the New York company was guilty of giving short measure in its supply of gas. The company's meters were described as "inaccurate" and failing to measure "the true quantity of inflammable gas" paid for. The quality of the gas was described as "deteriorated" because it allegedly contained nearly 80 per cent of "atmospheric or some other kind of air."[1] A bill to provide for the inspection of gas meters in New York City was successfully passed in the Assembly (95 in favor, 3 against) in April 13, 1827.[2] It failed of

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[1] New York State Assembly Journal, 50th Session, p.998.

[2] Ibid., p. 1099.

passage in the Senate[3] and the first attempt at state regulation of the service provided by a public utility ended without further action being taken (a bill for the inspection of gas meters was finally passed in 1859).[4]

Consumer agitation and reports of the financial success of the New York company encouraged other New Yorkers to attempt formation of a competing gas company. Barely two months after gas had first begun to surge through six-inch mains on Broadway, a petition was presented to the State Assembly by John Lamb and Samuel B. Ruggles proposing the incorporation of the United States Gas Light Company for the manufacture of illuminating gas in portable containers for the lighting of ships, factories and other places too remote or inaccessible to be supplied from the gas works of a fixed establishment.[5] The bill met with initial success but was eventually defeated when the Senate and Assembly failed to agree on proposed amendments.[6] The following year, 1826, saw a renewed attempt in the legislature to form a portable gas company. Robert Halliday and other citizens, in proposing formation of the "Portable Gas Company" stressed

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[3] New York State Senate Journal, 50th Session,p.1099.

[4] Laws of the State of New York, 1859, chap. 311.

[5] New York State Assembly Journal, 48th Session, p.908.

[6] Ibid., p. 1178.

the advantages to be realized by the manufacture of gas light without the costs of mains and service pipes. The hope was expressed that many of New York's citizens whose "circumstances and situation may exlude them from use of the article by present means" might finally be enables to enjoy the newest advance in lighting. There were, it was reported, several companies then in operation in Great Britain and Europe successfully manufacturing gas for lighting in this manner.[7]

The same assembly session saw the presentation of a bill to form a gas company for New York City under the title, the "North American Gas Lighting Company."[8] Benjamin Bailey, the sole name appearing on the Assembly reports, was a New Yorker serving on the boards of directors of several New York insurance companies. Bailey and his associates requested permission to supply gas light for that part of the city north of Grand Street. But the bill submitted by the New York delegation to the assembly went beyond the intent of the original sponsors. It would have given the Bailey group the right to sell gas to any part of the city including, of course, the district already being served by the New York Gas Light Company.[9] In support of this

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[7] Ibid., 49th Session, p. 501.

[8] Ibid., p. 293.

[9] Ibid., p. 59.

measure it was explained that a second company would create a "competition of interests" whose effect would be to "bring the cost of this necessary article of convenience within the reach of all classes of inhabitants."[10] Opponents of the measure declared that the proposed new company would interfere with the rights of the existing gas company. The latter deserved to be favored on "account of the heavy expenses they had incurred in sending agents to Europe to obtain information on the subject and making experiments." As pioneers in the development of gas lighting in this country they were entitled to the rewards of their enterprise. Furthermore, why grant the applicants more than they had asked for which as originally stated had been merely to light the city north of Grand Street. In answer to this, supporters of the bill attacked the existing gas company by citing the fact that meetings of citizens had been held to complain of excessive charges and that "these complaints were well founded because it was well ascertained that as much light could be furnished by means of gas at an expense of 15 cents as by means of oil, wax or tallow would cost 75 cents."[11] A compromise was finally agreed upon whereby the new company was to be restricted to the region north of Grand Street. In the Senate, however,

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[10] _Ibid._, p. 293.

[11] _New York Evening Post_, February 2, 1826.

supporters of the New York company succeeded in thwarting the action of the Assembly by referring the bill to a committee from which it never emerged.[12]

The Bailey group made a second attempt in the early winter of 1827 to gain a charter for their proposed gas light company.[13] Added to their petition was the name of Noah Jarvis, the highly respected and influential "collector of assessments" for the city of New York.[14] They expressly pointed to the need of gas lighting for homes and stores in the regions north of Grand Street. There was now, it seemed, less opposition in the legislature. The bill as finally passed on March 17, 1827 restricted the American Gas Light Company to the manufacture and sale of gas light in the area north of Grand Street, authorized a capital stock of $500,000, granted permission for the acquisition of real estate to the value of $100,000 and declared that no public street or highway in the city could be dug without first gaining the permission of the municipal authority.[15]

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[12] New York State Senate Journal, 49th Session, p.153.

[13] New York State Assembly Journal, 50th Session, p. 43.

[14] National Cyclopedia of American Biography, vol.III (New York: James T. White and Company, 1893), p. 216.

[15] Laws of the State of New York, 1827, chap. 81, pp. 62-65.

The new company immediately submitted a petition to the Common Council to secure the right to use the city streets for its gas mains.[16] But the supporters of the existent New York company both in and out of the council were not that easily dealt with. Within weeks after the American's request, two remonstrances against the company were submitted to the council. One, described as the remonstrance of a "number of Inhabitants," asked for denial of the right to use streets for gas pipes north of Grand Street. Another submitted by Robert Provoost made a similar request.[17] Provoost, painter and glazier, familiar to public officials, had been employed in repair of the public lamps since 1817[18] and could be expected therefore to have formed the most intimate ties with the New York company. Although the city paid the costs of lighting and repair, the labor force involved was under the direction of the New York Gas Light Company.

The Street Committee's report on the application was ready in June but no action aside from printing was taken. Alderman Ostrander of the 10th Ward, which was the ward in which gas was to be introduced, attempted to force consideration of the American's petition; but he was strongly and successfully opposed by Alderman Samuel Stevens of the Third Ward (lying well within the territory lighted by the New

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[16] NYMCC, XVI, 168. [17] Ibid., p. 205.

[18] David Maydole Matteson, ed., Analytical Index of the Minutes of the Common Council of the City of New York, 2 vols. (New York, 1930), s.v. "Provoost, Robert."

York company). Stevens declared that the interests of the municipality were not sufficiently guarded in the as yet unpublicized report of the Street Committee and he expressed himself as unwilling to pass on the matter hastily. The question, therefore, of arriving at an agreement with the American was again put aside.[19]

When in the middle of July, 1827, the council finally chose to call up the reports on the American Gas Light Company's petition (four months after it had been submitted), they turned their attention to two major problems. Objections by New York's citizens to the "unpleasant effects" caused by the presence of gas works in the city proper had prompted a demand that the council prescribe the locations at which such works were to be erected, preferably an area to the north of the populated regions. This the council refused to do but acting upon the recommendation of the Street Committee they concluded that the company ought not to be allowed to erect buildings south of Sixth Street in the eastern portion of the city or south of Eighth Street on the west. The Law Committee whose report was joined to that of the Street Committee to form the basis of the franchise agreement added the stipulation that the gas works north of the prescribed boundary were to be within 200 yards

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[19] Morning Courier, July 4, 1827.

of the Hudson or East rivers.[20]

A second major problem was the rate to be charged the city for the supply of gas to the public lamps. Now that the privilege of using the public streets for gas mains had shown itself to be such a profitable one, the Councilmen were determined to obtain the best possible terms for the city. Despite the fact that the city had reached an agreement with the existent company to light the public lamps for the same cost as would be involved in producing an equal "quantum" of light by oil, the council now proposed that the new company should light the public lamps at a sum 10 per cent less than what had been the average cost of lighting by oil for the preceding year.

Other provisions were equally onerous from the company's point of view. The company was restricted in its right to dig up the streets for the laying of pipes by the requirement that this could only be done in "such streets as this Corporation may from time to time grant special permission for." The company was also to be forced to remove its gas pipes at its own expense when the city engaged in street repairs. One particularly restrictive provision suggested by the Street Committee and which we may assume was in the contract that was eventually drawn up, stated: "If the Company do not any time in the opinion of this Board, comply with their agreement, the Board may by a resolution

cancel this permission and agreement."[21]

Although the council at its July meeting had noted that the gas company was disposed to "accede" to the reports and recommendations of its committees, the company made known its objection to harsh terms proposed when the 'Articles of Agreement were offered for signing several months later. It seemed that the negotiations were over then and there, but after giving the matter second thought, the American Gas Light Company submitted a petition on October 8, 1827,[22] asking for modifications in the contract. The modifications requested asked for the right to supply gas to the public lamps on the same terms enjoyed by the New York company. They asked for revision of the requirement that the streets could not be dug up without Common Council permission but instead proposed that a simple notification of their intentions be given to the Street Commissioner (this was also a right enjoyed by the New York company). More time was needed for the construction of their proposed gas works and May 30, 1829 was proposed as the final date by which this should be done. The council agreed to these changes and a contract embodying them was finally granted.[23]

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[21] Ibid.

[22] Ibid., p. 526.

[23] Ibid., p. 628. No copy of the original contract between the city and the American Gas Light Company has been uncovered. Theoretically these and all other early contracts should be on file in the City Clerk's "Record Room" in the Municipal Building, New York City, but the state of municipal records is abominable (despite the best efforts of those in charge).

Unfortunately, the excessively long period of time consumed by these negotiations and the obvious hostility shown by more than a few members in the city government had exacted a toll among the American's supporters. An air of discouragement had set in. No use was ever made of the franchise so arduously attained and there was a mood of growing bitterness within the city toward the New York company who many were disposed to believe constituted the source and heart of the opposition to the spread of gas light to the upper wards, so long as this was to be done by another company.

A second possible reason for the deliberate disinclination to move forward on the franchise may have been the development of a new strategy by the directors of the American Gas Light Company. At least five of their number including the vice president and secretary of the board joined with a second group of investors to form a new gas light company hoping in the process to gain more favorable terms than had been given the American company.[24] A petition to form the Manhattan Gas Light Company was accordingly presented to the State Assembly on March 9, 1829.[25] A committee report to the Assembly three days later pointed out

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[24] New York Evening Post, April 15, 1833. Names of the first Board of Directors for each company are listed in the State Charter. See Laws of the State of New York, 1827, chap. 81 (for the American Gas Light Company) and the same Laws, chap. 59 (for the Manhattan Gas Light Company).

[25] New York State Assembly Journal, 52nd Session,p.658.

that gas light was now being "extensively" used in New York City and that there was but one company to supply a demand which had become so great that the stock of the New York company "is now and has been for some time, about seventy per cent above par." It alluded to the fact that another company (The American Gas Light Company) had received a charter some years earlier but had never made any use of its privilege because it was confined to that part of the city above Grand Street where demands for gas light were bound to be slight for many years to come. It also alleged that the gas sold by the New York company was of an inferior quality. Its high price had caused great dissatisfaction among the citizens using it and many had discontinued the use of it who would become valuable customers for a company able to furnish "pure" gas at a reasonable price. The proper lighting of the city was a matter of public concern, an object that would be served by the creation of another gas company.[26] Despite the committee's report, the bill did not succeed of passage, presumably because the proposal to give the Manhattan the right to use the territory now occupied by the New York Gas light Company aroused fierce opposition.

The Manhattan's backers were not deterred and resubmitted their petition at the next session of the New York

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[26] Ibid., pp. 688-689.

State Assembly, in January, 1830. After an attempt to sidetrack the bill, by shuffling it from one committee to another, it was finally brought up for debate at the end of January. After little more than two weeks of consideration, it was voted on and passed, 98 to 6. It was then sent to the Senate where discussion centered around a proposal to give the Manhattan the right to dig into the city streets without the consent of the Common Council.[27] Martin Van Buren, leader of the opposition, declared that the state legislature lacked the power to make such a grant during the existence of the charter of the New York Gas Light Company. Hence it was a useless grant because it could not be operative, without the assent of the company and of the corporation. Once again the New York company was defended on the ground that they had established their works and pipes at a considerable expense and if "they had been successful and if their stock stood at an advance, it was no reason that their rights should be infringed or that competition should be allowed to come in after they had paved the way."[28]

The debate was bitter. The New York company was denounced as a monopoly whose prices were inordinately high, that complaints were frequent and numerous, and that "the public convenience and the general interests required the

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[27] New York Evening Post, March 2, 1833. See also NYMCC, XIX, 317.

[28] New York Evening Post, February 19, 1830.

chartering of a new company." A supporter of the bill declared that in Baltimore where competition existed, the price of gas was 30 cents per 100 cubic feet, while in New York, where there was no competition, the same quantity of gas was sold at $1.00.[29] When these remarks were reprinted in the New York Post there was an immediate reply. A correspondent noted that there was no competition in Baltimore and gas was sold at 33 cents per 100 cubic feet. In New York the price was 80 cents per 100 cubic feet.[30] The difference was explained by the fact that the gas in Baltimore was made entirely from coal. The gas in New York was manufactured from rosin and oil, yielding, according to the author's calculation, 20 per cent more illumination.[31]

In an attempt at compromise, several amendments were sponsored by Senator Stephen Allen, former Mayor of New York. As Mayor, in 1823, he had given his approval to the contract with the New York Gas Light Company. He now proposed that the Manhattan Company should not be allowed to dig into the streets of the city without the permission of the Mayor and Common Council and that the rights and privileges being

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[29] Ibid.

[30] This is correct. See Appendix A below. Price of gas dropped to 70 cents on the last day of February and so has been cited as of March 1830. The threat of a rival gas company was obviously a prime factor in the rate decrease.

[31] New York Evening Post, February 20, 1830.

granted should not be construed so as to interfere with "exclusive rights and privileges" previously granted to any corporation in the city. Allen's amendments as passed were a bitter disappointment to the Manhattan's supporters, who had hoped, it was alleged, to bypass the mayor and council of New York City by means of a state charter.[32]

The amended bill was then accepted by the Senate and Assembly without further difficulty. It passed by a large vote and was signed into law on February 26, 1830. The charter granted the Manhattan the right to issue stock to the amount of $500,000 and to own real estate of $100,000 or less. The purpose of the corporation was declared to be the manufacture and sale of gas to be made from coal, oil tar, etc., to light the city of New York, subject to the limitations embodied in Allen's amendments. The company was given the right to lay its pipes in any of the streets or avenues of New York. Finally, the act would not take effect unless within 60 days of its signing, the American Gas Light Company surrendered all of the privileges granted by the charter of March 17, 1827 to the new Manhattan Gas Light Company.[33]

Announcements in the press at the end of February, 1830,[34] that a second company had been chartered for the

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[32] Ibid., March 2, 1833.

[33] Laws of the State of New York, 1830, chap. 59.

[34] New York Evening Post, March 1, 1830.

manufacture and sale of gas in New York City caused an almost immediate decline of more than 3 points in the value of the stock of the New York Gas Light Company (from 155 to 152 1/4).[35] The New York company's Board of Directors moved quickly to meet the challenge and a first step was the lowering of the price of gas from 80 to 70 cents per 100 cubic feet, effective as to the last day of February.[36]

The Manhattan was busy organizing itself. In April, its newly appointed Board of Directors elected Robert McDermut as its president. The board and its president then prepared a document which was forwarded to the Common Council on May 3, in which it called for the annulment of the contract made by the city with the New York Gas Light Company and asked that the right to use the city streets for the passage of gas mains be transferred to the petitioners.[37] The Manhattan charge that the New York company had failed to comply with the terms of its agreement in May, 1823, to provide the city with gas of the "best quality"; that their works constituted a nuisance, and that the rates were exorbitant. The Law Committee of the council was given the task of studying these charges. Six months elapsed before that body returned its report and recommendations.[38] The committee

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[35] Ibid., March 2, 1830.

[36] New York Gas Minutes, p. 119 (March 1, 1830).

[37] NYMCC, XIX, 2. [38] Ibid., pp. 315-32.

after considering the charge that gas being furnished to the public lamps in New York was greatly inferior in brilliance and intensity to that used in the public lamps of London, concluded that the rosin gas supplied by the New York company was, in fact, superior to the coal gas used in London. The failure to provide sufficient light was not due to the quality of the gas but to the greater distances between lamp posts in this city as compared to London. The latter allowed a distance of 90 to 100 feet between lamps while in New York the corresponding distance was 148 1/2 feet. The New York company was also prevented from supplying a larger flame because the glass panels used on the lamps were too small and would not survive more intense heat. Concerning the charges that the New York company's works were a nuisance that their pipes were laid so carelessly in several streets that they were offensive to the citizens, and that "pretended reductions" in gas rates were "wholly nominal and deceptive," the committee responded by pointing out that the gas works in question were conducted with care and cleanliness and were, in fact, far less offensive than similar establishments in London. In regard to complaints that the rates of the established company were exorbitant, the committee declared: "No proof has been adduced to show that better Gas could be furnished at less or even at the present rate." The gas light company in Boston received $10 per year for the supply of gas to each public gas lamp, the rate in London was $25 while

New York paid $5.25 per lamp for its gas supply. As to the argument for a second gas company on the ground that it would yield the benefits of competition, the Law Committee pointed to the results of an investigation instituted by Parliament which had shown the confusion resulting from the operation of several companies in the same area:

> Serious evils grew out of the operation of different gas Companies in the same district, the breaking up of the pavement for two sets of mains [in] the place of one, the confusion and disorder produced by pipes crossing and intersecting each other, the disputes and delay in identifying leakages, altogether became so great an inconvenience that it proved absolutely necessary to separate and confine the different Companies to different districts, which distinct separation was accordingly made of the different Companies; and all the latter grants made by Parliament for the metropolis to new Companies have been confined to particular and exclusive sections of the City.[39]

The New York Company, it was stated, had been in operation between five and six years during which time as a result of careful management there had not been a serious failure in the supply of gas or the occurrence of any mishap to the inhabitants of the city. There thus seemed to be no grounds for revoking the existing contract, and the Law Committee thus presented a resolution to the council opposing granting the petition of the Manhattan Company.

The report created a dilemma in the council. While many of those present were disposed to accept the committee's

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[39] Ibid., p. 320.

recommendation, they looked with less favor on the "facts" which formed the basis of the committee's resolution. A motion permitting the councilmen to vote separately on these issues was passed, after which the council voted against accepting the "fact," followed by a second vote which accepted the "conclusions." The petition to revoke the contract of the New York company was thus denied.[40]

The Manhattan had lost this battle but conditions favorable to its cause were being created by the population growth of New York City. The city's population had passed the 200,000 mark in 1830 and began to increase at an accelerated rate. The period from 1830 to 1835 registered a gain of 36 per cent. Most of the increase occurred in the regions north of Grand Street, the northern boundary of the New York company's gas district. In 1823 when the New York company had first received its charter, more than 75 per cent of the city's population lived below Grand Street. By 1830, almost one-half lived above it and the movement northward was continuing. Five years later, the center of gravity of the city had shifted to the extent that approximately two-thirds of the population lived outside of the gas district of the New York company.[41]

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[40] Ibid., pp. 320-21.

[41] Estimates of population within and without the gas district of the New York Gas Light Company have been compiled by the author from data given in Franklin B. Hough, ed.,

A consequence of this growth was a change in the character and composition of the Common Council. The number of aldermen depended on the number of wards into which the city was divided. Between 1808 and 1824 the city was divided into 10 wards and the Common Council functioned as a relatively stable unicameral body with an alderman and assistant alderman representing each ward.[42] Between 1825 and 1827, in response to the rising tempo of growth, four new wards were created; an additional ward was created in 1832 increasing the total number of wards to 15.[43] The new wards were formed to accommodate the growth of the city northward and in all cases they brought to the Common Council aldermen from wards not serviced, either privately or publicly, by the

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Census of the State of New York for 1855: Prepared from the Original Returns (Albany, 1857), p. xxiv. See also the American Annual Cyclopedia and Register of Important Events for the Year 1861, vol. I (New York: D. Appleton and Company, 1862), p. 525. A useful map for calculations of the number of New Yorkers living above and below the Grand Street line may be found in Edwin Williams, ed., New York As It Is In 1833 (New York: J. Disturnell, 1833).

[42] The Common Council in this period consisted of the Mayor, the Recorder, 10 aldermen and 10 assistant aldermen. See Valentine, Manual of the Corporation of the City of New York, 1850 (New York, 1850), p. 230-238.

[43] A convenient table for the data of ward growth is to be found in John J. Disturnell, New York As It Was and As It Is (New York: D. Van Nostrand, 1876), p. 378.

New York Gas Light Company. The number of council members less disposed to sympathise with the New York company and more disposed to support efforts to create a rival company was continually increasing.

Already, increased demands by the inhabitants of the upper wards for more adequate street lighting had forced the Common Council to extend the Watch and Lamp District. This included the areas within which the citizens were taxed in order to provide for such services. Until December, 1830, the Watch and Lamp District had extended from the East River to the Hudson River as far north as 14th Street. Acting on a petition from the inhabitants of the 12th Ward and taking into consideration the "numerous improvements and dense population" of the district, the Watch and Lamp Committee recommended extension of the Watch and Lamp District to 21st Street west of 6th Avenue.[44] Reconditioned lamp posts from the lower wards plus some that were newly purchased were installed in the new district but the pace of providing improved street lighting remained frustratingly slow.

Some New Yorkers, impatient with the city's failure to provide public gas lamps, proposed that where gas was available they be permitted to erect their own gas lamp posts. They agreed to bear the expense of having the post supplied with gas, asking only that the city lamplighter (who,

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[44] NYMCC, XIX, 390-391.

incidentally, although hired by the city was paid and directed by the gas light company) include the private post on his regular rounds. One such request dated 1831 would have cost the petitioner $50 for erection of the post and $10 for the annual supply of gas. This practice was often encouraged by the municipal authorities in the hope that its widespread use would apparently reduce the city's lighting expense. A note attached to the petition read: "your Committee is disposed to give them what they ask for and especially as it may be an example which others will follow in thus ornamenting the city."[45]

In November, 1831, the Committee on Lamps and Gas reported 570 applications for public street lamps with more expected to be submitted during the coming winter. The committee called upon the council to express an opinion as "to the extent they are willing to go in the use of gas for street lamps during the ensuing season, in order that the necessary fixtures may be obtained in time and the necessary funds provided for the purpose."[46] New York's growth and continual demand for expanded public lighting placed increased pressure on the Common Council. Encouraged by

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[45] See folder in the Municipal Archives, New York City, marked "City Clerk Documents, Approved—Lamps and Gas, 1831" which includes "Petitions of H.T. Tallmadge and others, to have lamps in Bleecker Street lighted," July 29, 1831.

[46] Proceedings of the Board of Aldermen, vol. I, p.418.

these developments and more particularly by the friendly reception given to their proposals by aldermen for the upper wards, the Manhattan Gas Light Company made preparations in the summer of 1831 to renew its attempt to acquire a municipal franchise. In July, 1831, the Manhattan announced that a suitable location for a gas works and estimates for the costs of its construction had been obtained. Consequently, the company had decided to open its books of subscription for the sale of stock.[47] Some days later the sale was reported to be a great success. Four times the amount of stock put up for purchase had been applied for, evincing not only the signs of confidence in the new company but also the general realization by the public that gas stocks had become an extremely profitable form of investment.[48] Most important, at about this time the Manhattan acquired the services of Timothy Dewey, former general manager of the New York Gas Light Company and one of the best informed gas engineers in the United States. Dewey had resigned from the New York company for reasons of "health and interest" in the fall of 1831.[49] In January, 1832, the Board of Directors of the New York company informed Mr. Dewey that in "consequence of his having arrayed himself against the interests

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[47] New York Evening Post, July 18, 1831.

[48] Ibid., July 22, 1831.

[49] New York Gas Minutes, p. 31 (September 3, 1831).

of the Company . . . he discontinue his visits to any part of the premises,"[50] an indication that he had been for some time an employee of the Manhattan company.

In the fall of 1831 both of New York's gas companies were once more before the Common Council. Robert McDermut, newly elected president of the Manhattan company, wrote a letter to the council requesting permission to use the streets for the laying of gas mains. He reminded the council that $125,000 in capital stock had been raised and that it was anxious to proceed along the terms of its charter as granted by the state legislature.[51]

The New York company filed a counter proposal, a week later, asking that the council confine the operations of the Manhattan company to the area north of Grand Street.[52] There was little disposition at this time among any of the parties concerned to argue this point. The Manhattan would have to be confined to the area above Grand Street. The point at issue was now the terms upon which gas light would be supplied for the public lamps. The attitude among most of New York's aldermen in the winter of 1831-32 was that the granting of the valuable privilege of a gas franchise should

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[50] Ibid., p. 142 (January 21, 1833).

[51] Documents of the Boards of Aldermen and Assistant Aldermen, vol. II, Doc. No. 25, pp. 107-108.

[52] Ibid., pp. 113-114.

be made the occasion for obtaining the most favorable terms possible for the public gas supply. The Manhattan attempted to clarify its position by submitting a series of "propositions" which would govern the relationship between the city and the company. On the question of the price of public gas, the company declared that since they were not asking for "exclusive privileges," they could not undertake to light the public lamps for a sum less than the cost of the gas to be consumed. "They are willing to relinquish all profit and to charge the public only so much as will indemnify them for the actual expense. . . . They therefore propose to furnish the Gas at cost, or to charge therefor 25 per cent less on each 100 cubic feet of Gas for the Public Lamps, than they charge to their general customers—the Common Council to make the election."[53]

The Manhattan defended its position by explaining that a company which operated under "exclusive rights" or a monopoly could provide a gas supply to the public lamps at less than cost by increasing the rates charged consumers to a level which would indemnify them for the losses incurred. Consumers in such "exclusive districts" were being forced to bear an "unequal and oppressive" tax. Companies lacking this privilege could provide gas at less than cost only by placing the burden on their stockholders—an impossible

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[53] Ibid., p. 115.

solution and one which would amount to a prohibition on the company to use the powers conferred on it by the legislature.[54]

The terms for lighting the public lamps as presented by the Manhattan company were rejected by the Board of Aldermen's Committee on Lamps and Gas, on March 19, 1832.[55] It contended that the privilege of laying down pipes in the city streets ought not to be granted until the question of the price to be charged for the supply of gas to the public lamps was settled. The council, however, split on the question and the committee's recommendation was carried only after the deciding vote had been cast by the President of the Board of Aldermen. The signers of the unfavorable report had been Aldermen Anthony Lamb and John Y. Cebra, representatives of the 5th and 1st wards respectively, both within the territory then being lighted by the New York company.

One month later, the friends of the Manhattan were successful in winning reconsideration of the matter by a new Special Committee on which two of the three aldermen came from wards located in the portions of the city still struggling along without gas light. This committee submitted a report accepting the earlier contentions of the Manhattan company. Consideration of the matter was interrupted, however, by the outbreak of a severe cholera epidemic in the city commencing

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[54] _Ibid._, pp. 115-116. [55] _Ibid._, pp. 116-118.

in June and it was not until the following October that the report was presented to the Council. The committee offered calculations to show that the New York company was supplying public gas lamps at a loss, If charged at the rate to private consumers, each public lamp would use gas to the amount of $29.92 per year, but the price paid by the city was $5. They claimed that the resulting loss was being borne by the consumers in the gas district. The Manhattan company claimed that since it had not been given an "exclusive right," and since competition was to be used to safeguard the public interests, companies forced to compete ought to be given a fair remuneration for their services to the city. The rate they proposed, and which was eventually carried over into final contract, was 25 per cent less per lamp than the charge to their private customers, but in no event were they to exceed $15 per lamp per year.

The committee also proposed that the duration of the Manhattan contract be co-extensive with that of the New York company. Thus "a spirit of emulation" would be excited and when the charter of the New York company should expire, the whole city would be opened to competition for a new contract to be given to "that association which has most sedulously performed its engagements with the public."[56] A final agreement, reached by resolution approved by the Mayor and Council

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[56] _Ibid._, pp. 121-125.

in December, 1832, confirmed the right of the Manhattan company to use the streets above Grand Street for its gas mains subject to the company's agreeing to supply gas to the public lamps at a rate of $15 per lamp, and subject to the specification that the Manhattan must furnish gas to public lamps as requested by the city. This stipulation was intended to circumvent difficulties being encountered with the New York company which was at the time manifesting an active opposition to the council's desire to increase the number of public gas lamps in the lower wards.[57]

The publication of the proposed draft of agreement, to be signed by the city and the company, unleashed a new flood of controversy. Since the agreement gave the Manhattan company the right to lay mains through Grand Street,[58] that street would have the dubious privilege of being occupied by two gas companies. The older company immediately challenged this view claiming that Grand Street had been and should be reserved for its use exclusively. To compound the confusion, a petition was received by the Board of Aldermen some months later on behalf of the New York Gas Light Company asking that body for use of all the streets above Grand and Canal streets but below Sullivan Street. The purpose of this maneuver was

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[57] Proceedings Approved By the Mayor, vol. I, pp.319-20.

[58] Documents of the Board of Assistant Aldermen, vol. II, Doc. No. p.438.

apparently to establish Grand Street as lying within the territory of the New York company.[59] As a result, rumors circulated that the New York Gas Light Company was attempting to extend its gas district into the area above Grand Street, a development which would have reopened the quarrel and further delayed advent of the Manhattan. The New York Evening Post attempted to calm local fears by explaining that the New York company had merely sought in its petition to keep the Manhattan from using the streets which formed the outer boundaries of its own gas district.[60]

Some members of the Board of Aldermen expressed doubts as to whether the older company had been given the right to light Grand Street in its entirety. The company thereupon informed the council that they had been required by the corporation to supply gas for the public lamps on the north side of Grand Street as well as on its southern side and that gas mains had been laid by the company on both sides of the street after due notice to the street commissioner. The company estimated the value of its "gas furniture" rented to the occupants of both sides of Grand Street at $5,000. Further, it was pointed out that the contract with the American Gas Light Company in 1827 had contained a clause

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[59] Proceedings of the Board of Aldermen, vol. IV, p.250.

[60] New York Evening Post, March 30, 1833.

leaving the New York company in full possession of Grand Street and they asked that such a clause be inserted in the contract with the Manhattan company.[61]

But, as the Post observed, even if the right of the New York company to exclusive use of Grand Street were doubtful, what advantage would be gained from destroying the property of the older company and giving the same to the Manhattan. The answer was obviously none. The use of the same street by the two companies would double the injury to the pavement and make it more difficult to locate gas leaks. Why favor the new company when the older one supplied gas to the public lamps at a much lower rate? The Post concluded its defense of the New York company by referring to the petition presented by the Manhattan to the Common Council on August 8, 1831. This document had asked for permission to lay pipes in the streets north of Grand Street, a proposition to which the Common Council had assented. From the point of view of the New York company "north of Grand Street" did not include Grand Street and the company saw no reason why its claim to the right of service to the whole of Grand Street should not be honored.[62]

The question of boundaries was still unsettled when the Common Council and the mayor signified their approval of the draft agreement with the Manhattan company which was

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[61] Ibid.

[62] Ibid.

signed and executed into law on May 8, 1833. The long struggle to win an agreement had ended, the terms of which undoubtedly provided satisfaction to the directors of the Manhattan company. They had not been forced to meet a deadline for the construction of a gas works and the beginning of operations. The fittings and fixtures for the public lamps, which under the 1827 contract with the American Gas Light Company were to be supplied by the company, would now, under the terms of the new agreement, be provided at public expense. A rate had been obtained for the public gas lamps which was twice the amount being paid to the older company. Several novel features reflected increased municipal supervision. The street commissioner was to appoint someone to supervise the laying and repairing of mains. The wages of this person were to be paid by the company although he was to be responsible to, and directed by, the street commissioner. The breaking up of streets for pipe laying was not to take place between December 1 and March 1 without the consent of the street commissioner. On all other occasions, the streets could be opened after giving 48 hours' notice, thus relieving the company of the necessity to obtain permission to make repairs to its mains. The agreement was to last for a period of 20 years and expire on May 12, 1853.[63] The Manhattan had

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[63] Documents of the Board of Aldermen, vol. I, Doc. No. 48, pp. 557-61. A reprint of the Manhattan's contract with the city as of May 8, 1833. Originals of gas light contracts with the city were unavailable in the Municipal Archives.

a workable and effective contract and the municipal authorities were satisfied that they had remedied the defects which had emerged after the granting of the first franchise in 1823. The new contract represented a significant improvement over the terms granted to the American Gas Light Company in 1827. The difference is to be explained by the decline in influence of the New York Gas Light Company and its supporters in the Common Council as the gas district below Grand Street was eclipsed by the city's northward growth.

The long struggle begun in 1827 to provide New York with a second gas light company seemed to have ended when a new and more violent controversy erupted over the location of the gas works. According to the new contract, the Manhattan company had been allowed to erect its gas works on the margin of either the Hudson or East River, but not south of 14th Street. In May, however, the company petitioned the Common Council to erect a gas works in the 11th Ward east of Avenue A and south of 1st Street.[64] The company had already contracted for the purchase of half a block of ground between Lewis and Mangin streets, bordered by 5th and 6th streets on the East River. The Committee on Lamps and Gas had studied the proposal and saw no objection to the proposed site. Its closeness to the river gave it the advantage that offensive

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[64] Proceedings of the Board of Aldermen, vol. V, p.25.

materials accumulated in the manufacture of gas could be directly discharged into the tideway. Since this particular location was also the most easterly part of the island, the westerly winds usually prevailing in the city would drive the smoke and other offensive exhalations directly from the city.[65] A proposed alternative site above 14th Street possessed none of these advantages and would, in fact, require the gas works to be built 1,500 feet from the river. In view of "great improvements recently made in the manufacturing of gas rendering it less offensive" the proposed site below 14th Street was considered to be the best available and the committee accordingly recommended that the company be permitted to proceed with its plans for erecting a gas works despite the implied violation of the newly signed franchise agreement.[66]

But they had reckoned without the inhabitants of the 11th Ward whose homes and property were adjacent to the proposed works. Upon hearing of the council's intention in early July, 1833, they submitted in two weeks' time a petition signed by James Knapp and 200 others, and also a petition signed by Augustus Wynkoop and 70 others, objecting to permission to build a gas works in their ward, no matter

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[65] Documents of the Board of Aldermen, vol. III, Doc. No. 10.

[66] Ibid.

how inconspicuously placed, and despite assurances of improved methods of purification. They asserted that this clearly violated the original agreement with the city. Outcry by the citizenry blocked council approval and stalled the company's progress in the summer of 1833.[67]

In the early fall, the Board of Aldermen met to consider the citizen remonstrances. The petitioners argued that they had with great difficulty brought their properties to their present value, and that now, "when better prospects begin to dawn," they begged the protection of the council from the "great evil" threatening. They urged that the Manhattan company be forced to adhere to the original terms of the franchise agreement.[68] They were supported by Henry P. Robertson, alderman of the 11th Ward and member of the Committee on Lamps and Gas, which had originally agreed to the site proposed by the Manhattan. Robertson now filed a dissenting report. He pointed out that he had been a member of the Special Committee which had reported in favor of the Manhattan's application, and he reminded the Board of Aldermen that the question of a site for a gas works had been fully discussed when the draft agreement was being prepared, at

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[67] Proceedings of the Board of Aldermen, vol. V, p. 142.

[68] Documents of the Board of Aldermen, vol. III, Doc. No. 19, pp. 123-126.

which time the company had mentioned a purchase of land above 14th Street. "Experience has proved that these manufactories are offensive to any neighborhood in which they are situated," he argued. He pointed out that the location asked for by the company, and recommended by the majority of the committee, was "the seat of our most extensive shipyards; occupied by a numerous, highly respectable, and valuable class of mechanics," who were obliged to reside in the neighborhood. Many had purchased their property since the execution of the contract, "not expecting so great a nuisance to be located near them, to their injury," and which would "compel them either to constantly inhale its noxious vapours or quit the scene of their accustomed labour."[69]

Concerning the argument of the Committee on Lamps and Gas, in its discussion of the proposed site, that the area above 14th Street was far more remote from the river than the one under consideration and, with the growth of population, would place the gasworks in a populated region inaccessible to the river, Robertson argued: "If this prove true, it will certainly result advantageously to the company, by placing them in a more central situation . . . thus facilitating the distribution of their gas."[70] His concern for

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[69] Proceedings of the Board of Aldermen, vol. V, pp. 276-77.

[70] Ibid., p. 277.

the effect of the noxious vapors appeared to be limited to the 11th Ward.

Coinciding with the uproar in New York at this time was a similar battle being waged by the citizens of Philadelphia. The citizens there had begun collecting signatures on a petition to the Select and Common Councils protesting against the plan to introduce gas lighting into the city. In addition to the danger of using "an article as Ignitable as Gunpowder" for the public lamps, they expressed great concern over the effects that waste products of the gas works would have upon their region, using as proof the Thames River in London which had become impure and unhealthy as a result of neighboring gas works. The Philadelphians concluded by urging the municipal authorities to continue lighting the city with oil.[71]

The intensity of public opposition to the site chosen for a gasworks had forced the Manhattan to look elsewhere. In October, 1833, two parcels of land were purchased on the south side of 18th Street and west of Tenth Avenue.[72] There was enough land here for the erection of a retort house, a

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[71] George B. Cortelyou, "Commercial and Financial Aspects of the Gas Industry," in Lectures Delivered At the Centenary Celebration of the First Commercial Gas Company to Sell Gas As An Illuminant (New York: American Gas Institute, 1912), pp. 75-76.

[72] Walter V. Clarke, comp., Research into the real estate activities of the early gas light companies on Manhattan Island, p. 53. MS in the files of the Consolidated Edison Company.

purification house and a gas holder building. That November, the New York Evening Post declared that a part of the new works would be "under cover" within 60 days, at which time machinery and gas holders were expected from England. The new plant was built with the public's fear of pollution in mind. Modern improvements were installed, which it was said, would carry away all offensive wastes by pipes leading directly into the Hudson River. An improved furnace with a particularly high chimney would lessen the effect of offensive odors. The Post, which had but recently printed bitter criticism of the Manhattan company, ended its review of the company's progress with the comment: "We say success to their exertions and profits for their enterprise."[73] The digging up of streets for the laying of mains provoked scenes strongly reminiscent of contemporary New York: "Our streets are again in an uproar, and once more for a laudable object, an object in which the upper wards are greatly interested. We found the Bowery lined with men and gas-pipes yesterday morning and on our return home in the evening both had vanished, the men to their homes (where they ought to be) and the pipes snugly underground."[74] A city directory in 1834 described the route taken by the mains: through 18th Street, Tenth Avenue, Hudson and Bleecker Streets, Sixth Avenue,

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[73] November 8, 1833.

[74] Ibid.

Waverly Place, Broadway, the Bowery, Broome, Center and Grand streets and other important streets. A full supply of gas was expected within that year.[75] Between September 25, and October 13, 1834, the Manhattan inserted a daily notice in the New York Commercial Advertiser announcing that applications for gas were being received by the company in its office at 49 Pine Street or at the works in 18th Street. The company expected that it would be able to begin the supply of gas in November to stores, dwellings, hotels, public buildings, churches, "manufactories" and other establishments.

The plan to begin supplying gas in November, 1834, had to be postponed due to a belated decision by the Board of Directors not to begin with the manufacture of rosin gas, as originally intended, but to wait until the following spring when retorts and other equipment utilizing coal could be procured from London. This was no doubt due to news coming from England at the time that conversion from rosin gas to coal gas was being carried out by British gas light companies.

In March, 1835, the necessary equipment arrived accompanied by an English engineer Thomas Greaves Barlow who was to arrange for the construction and operation of the coal gas apparatus. Several weeks later, New Yorkers living

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[75] Edwin Williams, ed., New York As It Is in 1834, (New York: J. Disturnell, 1834), p. 21.

north of Grand Street were thrilled to experience their first gas light.[76] The new company followed the old in charging 70 cents per hundred cubic feet of gas and for the rent of meters and fixtures. For the moment the Manhattan company faced unlimited demand for its product. The built up area of the city in 1835 extended to several blocks beyond 14th Street on the west side and to several blocks above Houston Street on the east side.[77] In the area of these borders south to Grand Street, approximately two square miles, those New Yorkers who could afford it waited eagerly for the installation of gas lights. The municipal authorities were anxious to begin extension of the public gas lamps along major avenues to 6th Street and the Manhattan promised shortly to become the major supplier of gas light for the city.

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[76] Clarke, Research into real estate activities, p.59. See also John H.G. Pierson, "Origins of the Consolidated Gas Company of New York," p. 118, MS in the files of the Consolidated Edison Company.

[77] Thomas Adams, H.M. Lewis and T.T. McCroskey, Population, Land Values and Government, vol. II of the Regional Survey of New York and Its Environs (New York: Regional Plan of New York and Its Environs, 1929), p. 53.

CHAPTER VIII

THE ILLUMINATION REVOLUTION

The establishment of a gas light company in the 1820's with the promise of a second company soon to follow aroused expectations in many New Yorkers that a new era of public and domestic lighting was about to begin. Though the future saw the eventual realization of these hopes, the pace in this early period was disappointingly slow. Promoters and partisans of gas lighting in their eagerness to encourage gas light had seriously underestimated the costs involved. Not a word had been said about the rental of fixtures and meters which proved to be such a heavy burden for the consumer. Under the threat of opposition gas companies, the rates charged for gas had declined from $1.00 to 70 cents per 100 cubic feet by 1830,[1] but this had little effect on total gas bills as consumers grew accustomed to using larger quantities of light. Accompanying the persistent increase in the number of users of gas was an equally persistent, if smaller group, who felt obliged to discontinue the service because of the expense involved.

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[1] See Appendix A.

The techniques of gas purification were far from effective. An unpleasant odor pervaded houses and apartments illuminated by gas,[2] and as a result the public often concluded that this form of lighting was best used in large, well ventilated rooms or out of doors in public lamps and gardens. The relative immobility of gas light was a serious handicap and those homes able to afford gas were also forced to use supplementary forms of lighting such as oil lamps and candles. While gas chandeliers overhead lighted the room, candles and lamps were placed on sideboards, desks, tables, etc. to provide a concentrated light source for those engaged in activities requiring a more intense illumination.

Early gas jets yielded a light that was often six to seven times as intense as an ordinary candle and more than three times as bright as best table lamps of the 1830's.[3]

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[2] "New Lamps for Old Ones," Littel's Living Age, XXI (April 18, 1863), 104.

[3] The early gas jets gave a light equal to 12, 14 or 16 candle power. A candlepower is the amount of light given by a standard spermocetti candle burning 120 grains per hour in a quiet and pure atmosphere. Most household illumination in the 1830's yielded 1 1/2 to 2 candlepower. Camphene lamps of the best variety gave 3 candle power. See Walton Clark, A Century of Light (Philadelphia: n.p., 1913), pp. 11-12; Arnold R. Daum, "The Antebellum Revolution in Illumination: A Neglected Consumer Goods Industry" (A paper presented to the 77th Annual Meeting of the American Historical Association, December 27, 1962), pp. 3, 8; and Matthew Luckiesh, Torch of Civilization (New York: G.P. Putnam's Sons, 1940), p. 106.

The spread of gas light in commercial establishments and street lamps began to bring about a change in the public's attitude toward what constituted an acceptable standard of illumination. "Light, give us more light," a quotation from Goethe,[4] was a popular catchword of the day and was used to introduce editorials and comments on lighting in the daily press. The revolution in lighting technology spurred on by the introduction of gas lighting was a significant (but little studied) feature of the ante-bellum era.[5] Existing forms of lighting such as candles underwent refinement and change and new illuminants were developed; these changes affected the progress of gas lighting. An analysis of the evolution of non-gas illuminants and their use as competing light sources is particularly vital to an understanding of why gas light was not adopted more readily in private homes.

Improvements in candle manufacture had presented a constant challenge to the gas companies. Candles of the 18th and 19th centuries were made of animal fats, oil and waxes. The fats, principally tallow and suet, were a by-product of

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[4] These were Goethe's last words. See John Bartlett, Familiar Quotations, 14th edition, revised and enlarged by Emily Morison Beck (Boston: Little, Brown and Company, 1968), p. 479.

[5] Daum, "Antebellum Revolution in Illumination," p.16.

slaughtered sheep and oxen. One ox furnished 80 pounds of suet which yielded 300 pounds of candles of a type commonly described as "four to the pound." Wax produced a superior candle but was more difficult to obtain and hence more costly. Principal sources were the honeycombs of wild bees and the bayberry bush, a plant common to the New England area. Candles were also made from spermacetti, a translucent, slightly crystalline substance found in the head of sperm whale. Spermacetti candles had a high melting point, i.e. they did not drip or melt easily or grow soft to the hand in warm temperatures.[6] These candles were superior to all others and were considered to have such stable qualities that a spermacetti candle of a given weight became the basis of the unit of measurement known as "candlepower." The spermacetti candles were further improved in 1820 when a plaited wick was introduced to replace the twisted cotton wick and a snuffless candle was the result.[7] The cost of spermacetti candles was further reduced during the 19th century as new techniques made it possible to apply machine and mass production methods to their manufacture.[8]

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[6] Leroy Thwing, Flickering Flames: A History of Domestic Lighting Through the Ages (Rutland, Vermont: Charles E. Tuttle Company, 1958), pp. 102-104.

[7] William Haynes (editor), American Chemical Industry, vol. I (New York: Nostrand, 1945-1954), p. 82.

[8] William T. O'Dea, The Social History of Lighting (London: Routledge and Kegan Paul, 1958), p. 55.

Further improvements in candle production occurred during the 1840's in part as a result of the development of a large hog slaughtering industry in Cincinnati and other American cities. Lard, a by-product, challenged the ingenuity of soap and candle makers. European inventors had developed a process to split lard into component acids. Two of these, stearic acid and oleic acid, proved ideal materials for candles and lamps. Stearic acid when congealed produced a hard, stable and heat resistant wax which solidified immediately after melting so that candles made of this material were far more economical and less untidy than tallow candles.[9] Stearin candles cost one third less than sperm candles and gave an equally good light. They gained immediate popularity throughout the West and threatened to do likewise along the Atlantic seaboard.[10]

Candles were cheaper than gas and had the advantage of providing a movable light. Attempts were made to compete with the movable candle by developing systems of portable gas light. As mentioned earlier, a bill to incorporate the

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[9] Charles Edward Groves and William Thorp, eds., *Chemical Technology or Chemistry in Its Applications to Arts and Manufactures*, vol. II (Philadelphia: P. Blakiston, Son and Co., 1895), pp. 46-47.

[10] Arnold R. Daum, "The Illumination Revolution and the Rise of the Petroleum Industry, 1850-1863." (Ph.D. diss., Columbia University, 1957), pp. 10-11. Also Charles A. Joy, "The Artificial Production of Light," *Frank Leslie's Popular Monthly*, . IV (November, 1877), 635.

United States Gas Light Company, a company organized to supply gas on a portable basis, failed to pass the Assembly in 1825.[11] Subsequent efforts to gain a charter met with little success until the chartering of the New York Portable Gas Light Company in 1836.[12] This company, however, failed to raise the necessary capital for its operations. The difficult technical problems associated with the manufacture of portable gas plants and the design of vessels or containers which would perform as unattached table lamps using gas were only beginning to be solved in the late 1840's and 1850's.

The increased efficiency of oil lamps and their illuminants further complicated the situation for gas lighting. The American oil lamp of the 18th century used whale oil obtained from the so-called "right whale." After 1750, the "sperm" whale began to be hunted for the superior quality of the oil yielded. "Spermacetti oil" was ordered for purchase for the street lamps of New York City in 1792.[13] The end of the 18th century saw radical changes in lamp design, with the development of the Argand lamp. Aimé Argand, a French inventor, had developed aroung 1780 a tubular wick lamp (to replace the flat wick) which allowed air to be drawn up

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[11] See chapter VII above.

[12] Laws of the State of New York, 1836, chap. 168.

[13] NYMCC, I, 745.

through the center of the wick and thus gave a brighter flame. Several years later, Argand by accident found that a broken glass bottle held over the lamp further increased the brightness, and the lamp with a glass chimney was born. Later, it was discovered that a constriction in the diameter of the chimney at about the height of the flame, increased air turbulence and improved the lamp's brightness. The Argand lamp or lamps built on a similar principle dominated the forms which lighting devices took during the first half of the 19th century. The Argand principle was later applied to the construction of glass shades placed over gas jets.[14]

The uncertainty in the supply of sperm oil, and the consequent fluctuations in price led to efforts to find an alternative fluid. Robert Hare, the prominent American chemist, called attention in 1820 to a mixture of turpentine and alcohol which produced a highly luminous flame that when properly mixed burned without smoke like a gas light.[15] This came to be called "camphene." Isaiah Jennings, owner of a New York lamp firm, applied for a patent, in 1830, on a mixture of turpentine and alcohol which he named "spirit gas" because of the bright light produced. R.H. Dietz, another New York lamp dealer, experimented with similar mixtures but

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[14] O'Dea, Social History of Lighting, pp. 51-54.

[15] "Means of producing light," American Journal of Science, II (November, 1820), 172.

produced something he called "burning fluid" which proved to be less brilliant light than Jennings.[16] This became a widely used illuminant, because of the high cost of gas. It was said to be used by the humbler class of housekeepers and mechanics because of "economy." Nearly half the stores on Broadway were said to be lighted by it.

Camphene and burning fluids were highly explosive. According to the calculations of E. Merriam in 1853, as reported in the Scientific American, there had occurred in the year ending September, 1853, a total of 33 fatal and disastrous explosions of camphene and burning fluids in the cities of New York, Brooklyn and Williamsburgh, causing 19 persons to be killed and 23 others to suffer severe and fatal injuries.[17] In addition, three or four buildings were set on fire. The New York Tribune, the Journal of Commerce and several other New York newspapers campaigned actively for legislative action to reduce the dangers.[18] Its defenders claimed that the accidents which had occurred were due primarily

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[16] Robert Edwin Dietz, 1913, A Leaf from the Past, Dietz, Then and Now... (New York: R.E. Dietz Co., 1914), p.60. See also J. Leander Bishop, A History of American Manufactures, 1608-1860, vol. II (Philadelphia: Edward Young & Co., 1864), p. 351.

[17] "Burning Fluid," Scientific American, IX (September 17, 1853), 2.

[18] New York Tribune, July 25, 1861; Journal of Commerce, September 14, 1853.

to the careless handling by the householder, and to unscrupulous manufacturers who for reasons of economy were selling "burning fluids" which were improperly mixed and thus highly dangerous.[19] The use of the ordinary whale burning lamp for camphene was hazardous in that the flame was too close to the oil reservoir. A new burner was designed in which the lamp wicks extended upward and away from the reservoir giving the camphene lamp an added safety factor.[20] Despite this improvement the accident rate remained high.

An editorial entitled the "Camphene Nuisance" blamed its use upon the high cost of gas: "Had our Gas Companies put their prices down to the point or near the point of the gas makers of London they might have sold ten times as much as they do now and have kept the fluids above-mentioned entirely out of the market. But if we cannot get gas, let us go back to oil and save the lives and property of our people."[21] However, camphene continued to be widely used. It gave more than twice as much light at one-half the cost of ordinary sperm oil.[22] Gas had created a gulf between the brightly lit homes of the affluent and the dingy,

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[19] Journal of Commerce, ibid.

[20] C. Malcolm Watkins. "Artificial Lighting in America," Annual Report of the Smithsonian Institution, 1951 (Washington, D.C., Government Printing Office, 1952), p. 400.

[21] New York Tribune, July 25, 1851.

[22] Journal of Commerce, September 14, 1853.

poorly lighted homes of New York's poorer classes. Becoming popular around 1845, camphene helped to redress the balance. It was one of several technological developments in the forties which substantially improved the quantity of light available for the common man and so contributed to what has been termed a democratization of illumination.[23] The low cost of camphene appealed to the municipal authorities as a possibility for public lighting. An attempt was made in 1844 to light several streets with it. It was thought that camphene might be used to replace oil lamps in those streets without gas mains. The experiments were apparently unsuccessful.[24]

Changes in the mechanical design of oil lamps improved the utility of new illuminants. The United States Patent Office recorded more than 500 inventions of lighting devices between 1830 and 1860 as compared to scarcely 50 in the years 1790 to 1820.[25] The elegant Solar Lamp introduced in 1843 by a Philadelphia lamp firm was designed especially for the new lard oil. It yielded a light of six candle power giving a brilliance almost comparable to gas. It was one of the most popular table lamps of the era and lard now joined

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[23] Daum, "The Illumination Revolution," pp. 8-9.

[24] Proceedings of the Board of Aldermen, XXVII, p.159.

[25] Watkins, "Artificial Lighting," p. 400.

camphene and burning fluids in providing vastly improved illumination for New Yorkers to whom gas was unavailable.[26]

Ironically, the most important improvement in lamp oils in ante-bellum America derived from an attempt to introduce a new basic material for the production of illuminating gas. Abraham Gesner, Canadian born inventor, discovered that illuminating gas of good quality could be derived cheaply from the distillation of an asphaltic material called Trinidad pitch (from the island of Trinidad in the West Indies).[27] Hoping to find a commercial market for his discovery, he visited New York and in February, 1850, demonstrated his new process to a group of distinguished New Yorkers which included members of the scientific community. One pound of Trinidad pitch burning for 20 minutes produced six cubic feet of gas that burned with an "unusual brilliancy" and in a quantity large enough to supply one burner for four hours.[28] The gas produced that evening without purification lacked the offensive smell that was said to characterize the product produced by the New York

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[26] "New Lamps for Old," *Littel's Living Age*, . XXI (April 18, 1863), . 106.

[27] "Dr. Gesner's Patent Kerosene Light," *Scientific American*, vol. V (February 16, 1850), p. 172. See also, *Appleton's Cyclopedia of American Biography*, . II (New York, eds., James Grant Wilson and John Fiske)(New York: D. Appleton and Company, 1887), . 632-33.

[28] *Journal of Commerce*, February 1, 1850.

companies after purification.[29]

Gesner's experiments appealed at the moment because a nascent consumer movement was attempting at this time to arouse the city's population against the established gas companies. The consumers called for the development of rival means of gas production or rival gas companies as a weapon against alleged exorbitant gas rates and other charges. It was therefore a matter of special interest that one of the claims made on behalf of Gesner's proposed system of gas manufacture was its suitability for the lighting of public houses, theaters, etc. where a gas generator on the premises could be operated at a trifling expense and required "no more science to operate it than to boil a tea kettle."[30] A report by a member of the Academy of Sciences (not otherwise identified) estimated that where $1.00 worth of coal generated 1,000 cubic feet of gas, a similar quantity could be manufactured by Gesner's method for only 38 cents. According to a "conservative" estimate by Gesner, the inhabitants of New York would receive a far better light and save $74,000 a year by using the new substance distilled from pitch which the inventor named "kerosene."[31]

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[29] Courier and Enquirer, February 1, 1850.

[30] Ibid.

[31] "Dr. Gesner's Patent Kerosene Light," p. 172. The name kerosene was thus originally applied to an oil illuminant derived from mineral resources. It was also known as

A further demonstration of the Gesner process was made in the summer of 1850 when New York's consumers were attempting to decide upon the reliability of several proffered methods of gas manufacture.[32] At the end of the year there were reports of visits by crowds of citizens to an unusually brilliant display of lights in several New York stores using gas manufactured by the Gesner process.[33] Gessner's efforts, however, met with no permanent success, and he returned to Canada. In 1853, he moved to New York City with his family, determined to acquire financial support. Some members of the Board of Aldermen and other important New Yorkers were induced to attend a demonstration of his process where, according to later reports, all went well. But Gesner failed to convince those present that his system could be used for the public lamps. Gesner's gas process was seen as most suitable for production on a small scale, as might be required in steamboats, railroad cars or theaters. Discouraged, Gesner gave up his gas making activities and decided to promote the use of pitch for the

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coal oil. The term, kerosene, was later used to describe an illuminant derived from petroleum which is its present meaning. See Sam H. Schurr and Bruce C. Netschert, et al., Energy In the American Economy, 1850-1975 (Baltimore: Johns Hopkins Press, 1960), p. 98.

[32] New York Herald, June 29, 1850.

[33] Scientific American, VI (December 7, 1850), 89.

manufacture of lamp illuminants. The Asphalt Mining and Kerosene Gas Company was formed in New York City in June 1853.[34] The prospectus issued by the new company announced the possibility of using kerosene or "coal oil" to replace camphene and burning fluids for lamps. While the new firm failed to obtain immediate financial success, its promotion of coal oil was of great importance for the future development of American illumination.[35]

By the end of the 1850's, coal oil had banished other illuminants from the market. It gave a brighter light than camphene, was far safer and was less expensive to operate. A special lamp devised especially for coal oil increased its popularity and these burners were being sold at a price of $3.50 a dozen. By 1860 the wholesale price of coal oil had dropped to 75 cents per gallon and several years later to as low as 35 cents.[36]

Coal oil refiners were soon interested in a substance with similar properties, petroleum. A.C. Serris, a refiner of New York City, applied to petroleum methods used

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[34] J.H.G. Pierson, "Origins of the Consolidated Gas Company of New York" (MS in the files of the Consolidated Edison Company, n.d.), pp. 158-59.

[35] Harold F. Williamson and Arnold R. Daum, The American Petroleum Industry: The Age of Illumination, 1859-1899 (Evanston, Illinois: Northwestern University Press, 1959), pp. 46-48.

[36] *Ibid.*, p. 59.

in the distillation and treatment of coal oil and successfully used petroleum on a small scale in competition with coal oil.[37] A report by Benjamin Silliman, chemist and son of the editor of the American Journal of Science, on the nature of an oil sample submitted to him in 1855, and its possible use as an illuminant, led to efforts to obtain oil or petroleum by digging a well at Titusville, Pennsylvania.[38] The success of Edwin L. Drake in the venture in 1859 affected the course of American economic development. Petroleum became readily available and quickly replaced coal oil as a source for kerosene.

The immediate repercussion was a crippling blow to the manufactured gas industry in the nation and in New York City. The extent to which the demand for gas fell off is hard to measure. The Civil War broke out shortly after the events described and undoubtedly contributed to the loss of business. The New York Gas Light Company's ledger showed 4,000 customers in 1851 and more than 10,000 by the end of 1856. Thirteen years later the number stood at little less than 13,000. Though the Manhattan company had the advantage of new territory to be developed, it was only slightly more successful. Here too the rate of development after 1857 was seriously at odds with the rate achieved in the years immediately preceding.[39]

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[37] Daum, "The Illumination Revolution," pp. 137-38.

[38] Williamson and Daum, The American Petroleum Industry, pp. 68-71.

[39] Pierson, "Origins Consolidated Gas," p. 222.

CHAPTER IX

THE PUBLIC GAS LAMPS

The development of new illuminants in the second quarter of the 19th century had alleviated to some extent the crisis in domestic lighting, but the lagging growth in the number of public gas lamps posed a more complex problem. By 1834, more than seven years after the installation of 120 gas lamps on Broadway, the city had no more than 384 gas lamps. During the same period the number of public lamps fueled by oil had increased by more than 2,000.[1] Now, in the mid-thirties, a period of rapid commercial and population development, it became clear that public lighting had failed to keep pace with urban growth. The Common Council noted in 1835: "That with the exception of a want of good and wholesome water, there exists no subject of more general complaint than that of a want of sufficient light in our streets."[2] An English visitor, having in mind, no doubt, the rapid progress being made in London, remarked on a visit to New York in 1837: "A great defect in the

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[1] *Documents of the Board of Aldermen*, vol. I, Doc. No. 45, p. 506.

[2] *Ibid.*, Document No. 48, p. 551.

municipal arrangement is the want of sufficient street light in the street at night. The lamps are so far apart and so scantily supplied with light that it is impossible to distinguish names or numbers on the doors from carriages or even on foot without ascending the steps."[3]

Responsibility for the unsatisfactory rate of progress must be partly placed at the door of the Common Council. Their procedures for the consideration and installation of public gas lamps were cumbersome and more properly suited to the age of oil lamps. This body had stated in 1830, "The general substitution of gas for oil light cannot be too soon adopted,"[4] but, in reality, the economy minded council and its Committee on Lamps and Gas moved slowly in response to citizen petitions for street lamps. On one occasion, in 1830, when an unusually large number of gas lamps had been recommended for construction, the Committee on Lamps and Gas allayed the fears of economy minded members by asserting that expenditures would be carefully controlled by the committee so that the work "will not be done sooner than may be required by our fellow citizens."[5]

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[3] James S. Buckingham, America, Historical, Statistic and Descriptive, vol. I (London: Fisher, Son & Co.,1841), pp. 221-222. See also p. 49.

[4] Proceedings of the Board of Aldermen, vol. XI, p. 300.

[5] Ibid.

The Committee on Lamps and Gas responding, some years later, to criticism of its unpredictability in recommending the lighting of some streets as opposed to others attempted to set matters straight. The greatest benefit, the committee reported in 1835, is to be derived from lighting first those streets used at night for business purposes and in the vicinity of which criminals congregate for the commission of crimes. Next to be lighted are those in which the offenders lived and to which they returned after committing their crimes. Last to be lighted were those streets used for pleasurable purposes. The committee in issuing this statement expressed anticipation of censure from "many of their personal friends for thus placing our most fashionable streets in the dark" but expressed the hope that upon further reflection the community would support their actions.[6]

In the years that followed, the number of petitions for public gas lamps showed a continuous increase. But confusion reigned as the Common Council showed an inability to cope with the public's demand. While the earlier petitions of some residents remained bottled up in committees, others of more recent date were acted upon; charges of corruption and favoritism were frequently heard. The antagonisms between upper and lower ward councilmen, and between east

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[6] Documents of the Board of Aldermen, vol I, Doc. No. 48, p. 548.

side and west side, were reflected in council debates. In March, 1843, a resolution recommending the lighting of West Broadway even though gas mains had not been laid in that street aroused the ire of Alderman Smith of the east side as he recalled the earlier rejection of a similar petition for East Broadway on the grounds that it would be too onerous to require the gas company to lay mains for that purpose. The following exchange illustrates the "politics" of designating locations for public lamps.

> Alderman West said: "I beg to inform the Alderman that no such reasons were urged for not lighting that street, and besides, there are more stores in West Broadway, and the gas posts are erected."
>
> Alderman Lee: "There is another reason: West Broadway is on the west side of the town, and anything required to be done there, of course, meets with ready approval, while if it is on the east side it is treated with neglect."
>
> Alderman Davis moved that the petition be laid on the table until next meeting.
>
> Alderman Jones hoped it would not lie on the table.
>
> Alderman Purdy hoped it would lie on the table. He was opposed to partial legislation, and thought it decidedly wrong that the west side of the city should be favored at the expense of the eastern side. He would have the same justice extended to all.
>
> Alderman Davis withdrew his motion to lay on the table.
>
> Alderman Balis moved that the report and resolution be referred back. There was no such street as West Broadway.
>
> Alderman Jones then moved to amend by making it Chapel Street or West Broadway. He did not know

> whether there was any resolution authorizing it to be called West Broadway, but he knew there were boards up with that name on.
>
> Alderman Gedney moved to amend, by also inserting Spring Street.
>
> Alderman Davis said that if these amendments should be persisted in, he should move to have some of the streets in the upper part of city inserted.
>
> Alderman West said he wanted Fourteenth Street lighted as soon as he could get it.
>
> Alderman Davis: "Perhaps you will get somebody to live in it first."[7]

The most serious obstacle, however, to a more rapid advance of the public gas lamps arose from the unwillingness of New York's gas companies to comply with council requests for the supply of gas to the public lamps. This was due mainly to the fact that such requests often involved streets where gas mains had not been laid and would not be laid until demands for gas light from private customers were forthcoming. The supply of gas to the public lamps was onerous and unprofitable. The New York Gas Light Company, bound by the unfavorable terms of 1823 (basing the cost of gas on the cost of oil light in the preceding year) estimated in 1835 that the rate paid by the city covered only one quarter of the cost of the gas supplied.[8] Although the price of oil rose steadily after

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[7] New York Evening Post, March 14, 1843. Quoted by J.H.G. Pierson, "Origins of the Consolidated Gas Company of New York" (MS in the files of the Consolidated Edison Company), pp. 131-132.

[8] Documents of the Board of Aldermen, vol. I, Doc. No. 55, p. 602.

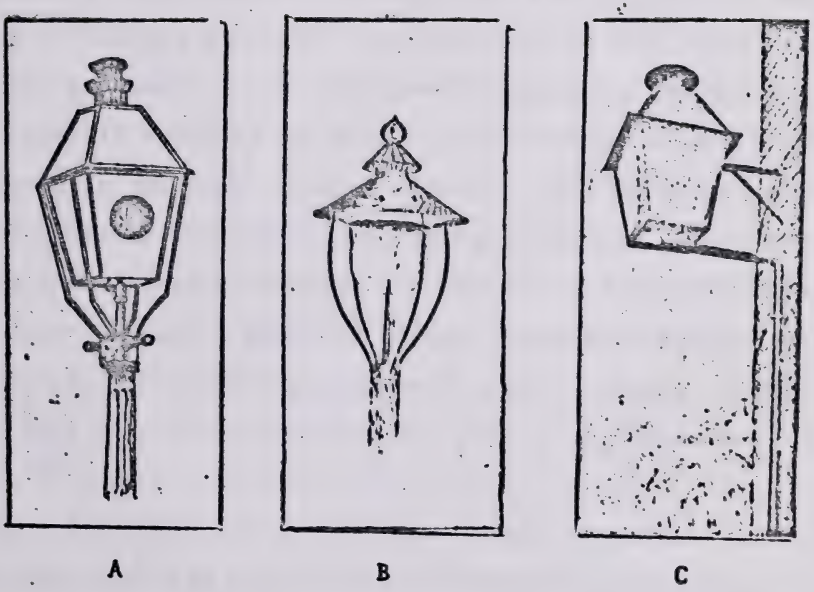

Figure 4

A Old Square-Top Lamp with Red Ball to Indicate Fire Alarm

B Round-Top Lamp which Succeded the Square-Top

C This Square-Top Wall Lamp Still Burns in Macdougal Alley

the initial agreement, the supply of gas to the public lamps remained a losing proposition.

The public authorities took the view that the losses incurred by the company were more than balanced by the valuable privileges granted.[9] The contract between the city and the gas company had outlined the procedure for dealing with council requests for public gas lamps by using the words "reasonably require." Thus a committee of the council conducting one of the numerous investigations into the extent to which the city might require the company to erect additional gas lamps concluded that the company could not be required to erect and light public gas lamps in streets where, because of a lack of private requests for gas, no gas mains had been laid.[10]

A communication to the Law Committee of the Board of Assistants in 1843 made a further defense of the company's policies by citing expenses of $12,000 incurred at various times in laying 4 miles of main for the accommodation of the council which proved to be a complete loss to the company. The solution, the company contended, lay in providing greater compensation for the supply of public gas. While the New York company received slightly more than $6.07 for its gas,

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[9] Ibid., III, Doc. No. 95, p. 602.

[10] Ibid., pp. 602-3.

Boston paid $20.28, Philadelphia, $19.52, Baltimore $10.00, and the price in all of these was exceeded by that in major English cities.[11]

The Manhattan Gas Light Company was, according to its contract, not required to lay any pipes for the public accommodation but only to supply gas from such as they may already have laid, at a rate not to exceed fifteen dollars per lamp, and this in the area between Grand Street and Sixth Street.[12] In two years time, the need for an extension of the public lamps above Sixth Street had become apparent but the municipal authorities were determined that no agreement would be made until a new and satisfactory rate for the public lamps had been set. Such an agreement was not made until several years later, thus depriving the citizens above Sixth Street of the benefits of street lighting by gas until 1847.

These circumstances serve to explain why the minutes of the Common Council abound in resolutions that seem to duplicate each other over a period of many years. When the gas companies chose to deliberately disregard instructions to supply gas to public lamps in certain streets and avenues, the ward aldermen and assistant aldermen threatened legal

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[11] William Fox to the Committee on Laws of the Board of Assistants, October 1, 1843. MS in the files of the Consolidated Edison Company.

[12] Documents of the Board of Aldermen, vol. I, Doc. No. 48. p. 549.

action or submitted resolutions designed to compel action. The lighting of East Broadway is a case in point.

A resolution passed by the Common Council in October 1836 directed the New York Gas Company to light with gas all the streets included in its district.[13] Two years later, Alderman Willis of the Seventh Ward (on the east side) introduced a resolution to ascertain why East Broadway remained without gas lamps despite a previous council resolution.[14] This and succeeding resolutions were referred to council committees where they remained inactive. Four years later, the Committee on Laws, when directed to investigate the delay in lighting East Broadway, issued a report in which the president of the gas light company gave as the reason for East Broadway's continued subjection to oil lamps the absence of gas mains in the street. Some hope was expressed for the future.[15] The New York company was at this time building a gas works on the East River and shortly afterwards laid mains through part of East Broadway. By the spring of 1843 gas posts had been erected on the street, but the company took no steps to begin its supply of gas.[16]

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[13] Proceedings Approved by the Mayor, vol. IV,p.78-9.

[14] Proceedings of the Board of Aldermen, vol. XV, p. 279-80.

[15] Ibid., XXIII, 132-38.

[16] Ibid., XXI, 261.

Despite a series of council resolutions the year ended without any action having been taken. The situation had not been resolved in the spring of 1844 when a resolution seeking to force action by the Superintendent of Gas and Lamps was adopted.[17]

The lighting of wharves and piers presented a problem in public lighting that agitated the police and municipal authorities for several decades. These areas were the center of commercial activity, but inasmuch as they lacked private consumers or commercial establishments (in an area filled with warehouses) gas mains had not been provided. Yet there were pressing reasons for adequate lighting. First, there was the danger of accident to pedestrians in the area. Many cases of drowning had been reported of individuals who lost their footing in the darkness.[18] Next, there was the safety of cargoes in the process of being unloaded, and left on the docks when darkness fell. These cargoes were tempting targets for thieves. Finally, the ships anchored along South and West streets might themselves be boarded and robbed. In one instance when thieves were interrupted in their activities, the Chief of Police noted that darkness made it impossible to identify the perpetrators as they

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[17] Proceeding Approved by the Mayor, vol. XI, p. 224.

[18] New York Evening Post, January 13, 1852.

fled.[19] A report to the ouncil by the Commissioner of Streets and Lamps expressed the opinion that if the waterfront area were properly lighted, the city could dispense with a third of the entire police force at an annual saving of more than $150,000.[20] The necessary gas mains were finally laid in the waterfront areas in the spring of 1851 as an accommodation to the city and as part of the New York Gas Light Company's campaign to win revision of its original contract.[21]

Further problems were encountered in connection with the installation of gas lamps in the dock area. Unlike the docks in many European cities where docks were built of stone, those in New York were made of wood that formed too unstable a foundation for gas lamps. The cost of continual repairs was deemed to be prohibitive.[22] After several years of further delay, an attempt was made to use oil lamps with reflectors constructed so as to increase light efficiency,[23] but the waterfront remained for many years the most poorly lighted portion of the city.

The lighting of parks and public squares was almost

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[20] New York Evening Post, January 13, 1851.

[21] Documents of the Board of Aldermen, vol. XVIII, Doc. No. 6.

[22] Ibid., XX, Doc. No. 6.

[23] Proceedings of the Board of Assistant Aldermen, vol. LVII, pp. 420-21.

as difficult to achieve, and in consequence of poor lighting, robberies and assaults were common. Oil lamps were completely inadequate to pierce the foliage of the trees clustered in these areas; yet the lack of mains due to the lack of private gas consumers remained the key problem. Parks and squares, however, were centrally located and commonly frequented by citizens on their way home from the lower portions of the city, or by residents in the area attempting to relax for a moment or two. They were also located in the most elegant sections of the city.[24]

In 1848 and 1849, the insistent pleas and petitions of citizens living in the streets adjacent to the public squares and parks moved the council to action. The lack of private requests for gas light in these areas meant that the gas companies would not lay mains and it was obvious that a different remedy would have to be found. The solution adopted was to have the city pay the gas companies for the costs incurred in laying the necessary mains. The Superintendent of Gas and Lamps reported, for example, in the spring of 1849, that the sum of $1600 was necessary if gas mains were to be laid in Washington Square.[25] On his recommendation, the Common Council appropriated the sum requested and

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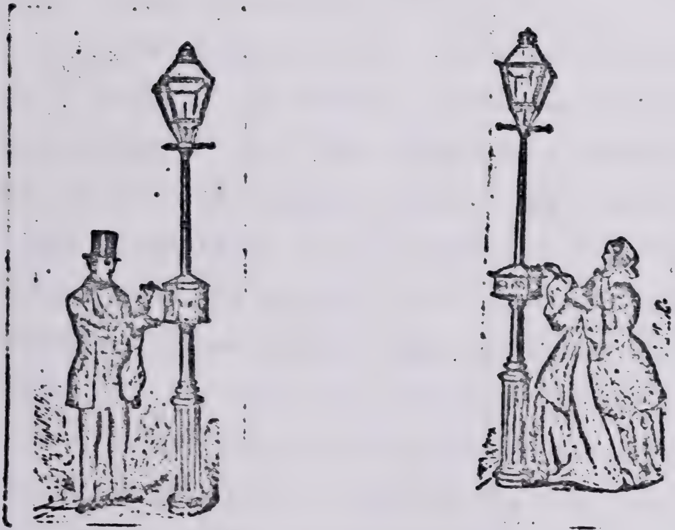
[24] Stokes, Iconography, V, 1812.

[25] Proceedings of the Board of Aldermen, vol. XXXVI, part 2, pp. 632-33.



Postmen Wore Silk Hats

Ladies Wore Hoops

Figure 5

Gaslight Mail Stations, 1859

the gas company then made the necessary arrangements. Having mains, the lamps could be erected without difficulty. A similar procedure was used for lighting Union Square, Tompkins Square, the Battery Park, Madison Square and other wooded areas of the city.[26]

The changes wrought in the city's parks and squares as a result of the council's policy must have been considerable as may be seen from a novelist's account of the impact of gas light on Tompkins Square. The square before gas light is described by the author as a "lampless lapse of earth" which was by night "four acres of brooding gloom, [in] which he who ventured to cross stood the risk of thievish assault." And after gas lamps had been introduced, the square is transformed into a "bright-lit realm where the tramp may fall prone on some of its many neat-built benches, but where the highwayman will find slim chance to ply his full trade."[27]

The Street Commissioner's report in the fall of 1860 revealed that resolutions directing public gas lamps to be placed in front of churches already having gas lamps within

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[26] See Proceedings of the Board of Aldermen and the Proceedings of the Board of Assistant Aldermen for the years 1848 to 1852 for the details in regard to the manner in which gas light was introduced to the city's squares and parks.

[27] Edgar Fawcett, An Ambitious Woman (Boston: Houghton Mifflin and Co., 1884), p. 107.

the church resulted in some churches having four gas lamps in front, or gas lamps standing within a few feet of each other. It was estimated that the cost of lighting only two gas lamps in front of each of the city's 300 churches would amount to over $15,000 per year exclusive of the costs of construction and repairs.[28] Council debates in the early 1860's reflected increasing concern over the question of providing public lamps for churches. Alderman Dayton questioned the right of the city to provide funds for the churches on the grounds that churches were in the same position as private persons or private corporations and should not be given benefits paid for by the city.[29] Alderman Brady expressed his hope that The Board of Aldermen had not got quite so "degraded" that they would not "patronize the churches a little. I think if they patronized them a little more than some other places, they would be better off." He accused Drayton of supporting the placing of a watering trough before a porter-house while refusing light in front of a church. Drayton replied that the watering trough was put up at private expense. Alderman Boole thought the council ought to contribute something toward religion and hoped

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[28] New York City Street Commissioner, Quarterly Report for Period Ending October 8, 1860, p. 126.

[29] Debates of the Common Council, 1862, pp. 565, 765=766.

the resolution would pass.[30] The resolution was passed and the practice of placing lamps in front of churches was continued.

The advance of public lamps in the territory of the Manhattan company along the major streets and avenues north of Grand Street was accomplished with relatively little difficulty.[31] During this era Broadway vied with the Bowery for the distinction of being the most brilliantly lit street in the city.[32] The uneven distribution of gas lamps among some of New York's streets created strange patterns of human traffic when night had fallen. Centre Street without gas lights lay deserted while Chatham Street, a parallel thoroughfare but enjoying the advantage of gas, was thronged with a torrent of human being. The Committee on Lamps and Gas expressed the opinion that installation of gas lighting on a more uniform basis would do much to relieve traffic congestion.[33]

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[30] *Ibid*., pp. 765-766.

[31] The problem of gas mains to provide illuminating gas for the public lamps did not exist on major thoroughfares due to existence of more than adequate consumer demand for private gas lighting. The companies were willing to provide gas mains for those streets where a dozen or more requests for gas had been made.

[32] Alvin F. Harlow, *Old Bowery Days: The Chronicles of a Famous Street* (New York: D. Appleton and Company, 1931), p. 216.

[33] *Proceedings of the Board of Aldermen*, vol. XXVI, pp. 576-77.

By 1843 the line of gas street lamps had travelled as far as Great Jones Street (a connecting street between Broadway and the Bowery, one block south of West Fourth Street), in the territory of the Manhattan Gas Light Company. By 1846, they were available as far north as 21st Street, and by 1848 as far as 34th Street. The movement of gas lamps lagged slightly behind the general advance of population and housing which showed a greater advance west of Broadway than east of that street. Broadway remained a fulcrum and point of measurement for the average growth of the city. Now and then new streets came into prominence while old ones disappeared. The introduction of gas lamps into Greenwich Village via Greenwich Street kept pace with the lamps on Broadway until 1844 when its limits were reached. Turning into Ninth Avenue the line of lamps was pushed from 12th Street to 23rd Street in a single year.[34]

In the fall of 1849, McDougal Street in Greenwich Village was fitted up for gas, and requests to light the street were made to the Manhattan Gas Light Company.[35] Today, after a century and a quarter, gas lights are still burning at No. 8 and No. 15 McDougal Street nourished carefully by those wishing to preserve a frail remembrance of the past.[36]

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[34] Pearson, "Origins Consolidated Gas," p. 128.

[35] Proceedings Approved By the Mayor, XII, 166.

[36] New York Herald Tribune, October 10, 1945.

Fifth Avenue moved ahead, modestly, cautiously. Gas lamps were fitted up between 15th and 18th Street in 1847. Gas lights and cobblestones were at 23rd Street in 1848, at 30th Street by 1850. Progress thereafter slowed as the street waited for people.[37] By mid-century, gas lamps had reached 23rd Street along most of the major north-south avenues on the west side, while those on the east lagged several blocks behind. The rate of introduction of oil lamps had slowed appreciably and was shortly to die out, but requests for such lamps were still being made especially in areas far out of reach of gas mains.[38]

Most of the credit for the relatively rapid spread of public gas lamps belongs to the Manhattan Gas Light Company which sought and obtained a new contract with the city in May, 1847. Of the 4,400 public gas lamps in New York in 1849, more than one third had been erected since June, 1847, a period of less than two years.[39] The Common Council expressed its gratitude and publicly commended the company

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[37] Proceeding of the Board of Aldermen, vol. XXXIII, part 2, p. 734. See also S.C. Burchell, "On The Avenue, Fifth Avenue," in New York, N.Y.: An American Heritage Extra in the History of the Nation's Greatest City (New York: American Heritage Publishing Co., 1968), p. 18.

[38] Proceedings of the Board of Assistant Aldermen, vol. XXXVI, p. 311.

[39] David Thomas Valentine, Manual of the Corporation of the City of New York, 1849 (New York, 1849), p. 50.

for having "faithfully and cheerfully performed all and more than the contract requires of them."[40] This contrasted with the situation in the lower wards where public hostility to the New York company was growing. The lack of progress in public lighting in some parts of the city may well have been among the instances of municipal neglect which Mayor Caleb S. Woodhull said in 1850 had driven thousands of New Yorkers to seek residence outside the city.[41]

Added to the frustrations was the practice of incorporating moonlight into the city's lighting schedule. When street lighting was first adopted in New York City in 1697 the inhabitants had been requested to set a lamp and candle on a pole in front of their houses in the "dark time of the moon." Now, almost a century and a half later, in the midst of an era of gas lighting, the moon was still being reckoned with. The city's contract with the gas companies called for lighting the public lamps on all days except those when according to calculations of the almanac, the moon was expected to shine. The moon's appearance, however, was often interfered with by clouds or rain which plunged the city, at such times, into deep darkness while New Yorkers stumbled about and freely vented their criticisms of a parsimonious

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[40] Documents of the Board of Aldermen, vol. XVII, Doc. No. 13.

[41] Proceeding of the Board of Aldermen, vol. XXXVIII, p. 117.

government.[42]

This situation endured until the early 1850's when the petitions of the proprietors of omnibus lines, the principal hotels in the city, nearly all the stores on the Bowery, a majority of the storekeepers on Broadway and wealthy merchants and property holders in the lower parts of the city, resulted in the passage of an ordinance directing that arrangements be made with gas companies to have the streets lighted every night from dark until day light.[43] The supply of public gas was not metered. A carefully calculated schedule had been set up and agreed upon by the gas companies and the city, to indicate when lamps were to be turned on and off for each month. This schedule in use for many years showed that the city used annually 2,300 hours of gas light. Elimination of moonlight increased the annual quota of gas light to 3,833 1/3 hours, resulting in a considerable increase in the cost of city lighting bills. Economy minded forces in the council made several attempts in the years that followed to rescind the council resolution and called for a return to the previous system. These efforts were unsuccessful. The foes of moonlight pointed out that by this time, 1855, nearly all European cities had adopted the plan of turning street lights on at dusk and extinguishing them

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[42] "More Light," Brother Jonathan, vol. VI, (September 16, 1843), p. 73.

[43] New York Enquirer, February 23, 1854.

at dawn. New York, it was stated, was a city in which travel at night exceeded that in any other city with exception of London. It could least of all afford this economy.[44]

The supporters of expanded public lighting won another important victory when the Common Council in the late 40's and early 50's voted to have all streets in the city lighted with gas as quickly as possible. The council and mayor had approved in 1836 a resolution calling for the lighting by gas of every street, not already lit by gas, in the territory of the New York Gas Light Company. This resolution had little practical effect coming as it did when the city was moving into a depression period which prevailed for several years. An attempt in 1842, however, to have the measure rescinded was unsuccessful. Shortly after the signing of a new contract with the Manhattan company in 1847, a similar resolution was passed applying to the areas above Grand Street in the territory of the Manhattan company. By January, 1853, the New York Gas Light Company was able to announce that there was not a public lane or alley south of Grand Street that the company could not supply with gas for public or private consumption.[45] No such announcement could be forthcoming for the Manhattan as that company had confined

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[44] Journal of Commerce, January 15, 1855.

[45] Pearson, "Origins Consolidated Gas," p. 155.

its efforts to laying mains and supplying gas to the area below 42nd Street. It had become obvious to many New Yorkers as the midpoint of the decade of the 1850's was reached, that the task of supplying gas to all areas in the city from Spuyten Duyvil to the Battery could not be adequately carried out with the resources available to existing companies. Plans were quietly being laid at this time for the organization of new gas companies to meet the now generally accepted fact that each and every street was to be lit with gas.

The oil lamp, whose introduction at the end of the 18th century had been a source of pride to New Yorkers, began to show signs of weakness. By 1851 the number of public gas lamps (6,696) in the city surpassed for the first time the number lit by oil (5,602).[46] But although oil lamps were destined to disappear in little more than a decade, they were at the moment still an important element of the system of public lighting. As the old locust post oil lamps were removed to make way for iron lamp posts fitted for gas, the former were transplanted to the northern areas, beyond the reach of gas mains, but where the inhabitants in the outlying villages were now badly in need of street lighting. The Commissioner of Streets and Lamps

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[46] Documents of the Board of Aldermen, vol. XXIII, Doc. No. 1.

proudly announced in 1852 that as a result of the erecting of oil lamp posts to the north of the active gas districts, New York now had thirteen and three quarter continuous miles of gas and oil lamps, from the Battery to Kingsbridge.[47]

Every effort was made by the municipal authorities to spur conversion from oil to gas. One important incentive was the saving in cost which occurred as the dwindling number of oil lamps required a smaller and smaller force of lamplighters. Unlike those devoted to gas lamps who for the most part were paid and directed by the gas companies, the oil lamplighters were all employed by the city and one of the last recorded figures gave their number as 90 in 1853.[48] The city being anxious to remove this burden, began to discuss the possibility early in 1854 of giving the task of maintaining and lighting the oil lamps to a private contractor. In February, 1854, an agreement was made with Smith D. Bellows to arrange for the lighting, trimming and keeping clean the public oil lamps and to furnish the necessary oil, etc. After three years of Bellows management, the citizens in the upper wards were in an uproar and demanded an investigation. Of the 1,500 lamps now left for Bellows to light, it was estimated that about one third were never touched, and on moonlit nights, Bellows provided no

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[47] Ibid., vol. XIX, part 2, Doc. No. 51, p. 1006.

[48] Valentine, Corporation Manual, 1853, p. 53.

service whatsover. The Lamp District had been extended to the upper wards and the citizens there were paying taxes for lighting privileges; but as far as the benefits received, Mayor Wood declared they might as well be living in Kamchatka.[49] Oil street lamps vanished from the scene sometime in 1863, the last year in which appropriations for the lighting of such lamps were made.[50]

The expanded system of gas street lamps which illuminated the city in the 1860's witnessed a refinement in techniques of the corps of citizens who were daily employed in lighting and extinguishing the public lamps. They were a colorful and intimate part of the life of the city. Each lighter operated within his own district, was well known to its residents and often fondly remembered in personal reminiscences of the past.[51] The lighters were generally appointed and paid by the gas company, but under the direction of the Superintendent of Lamps and Gas, at least to the point of following the careful and elaborate list of instructions drawn

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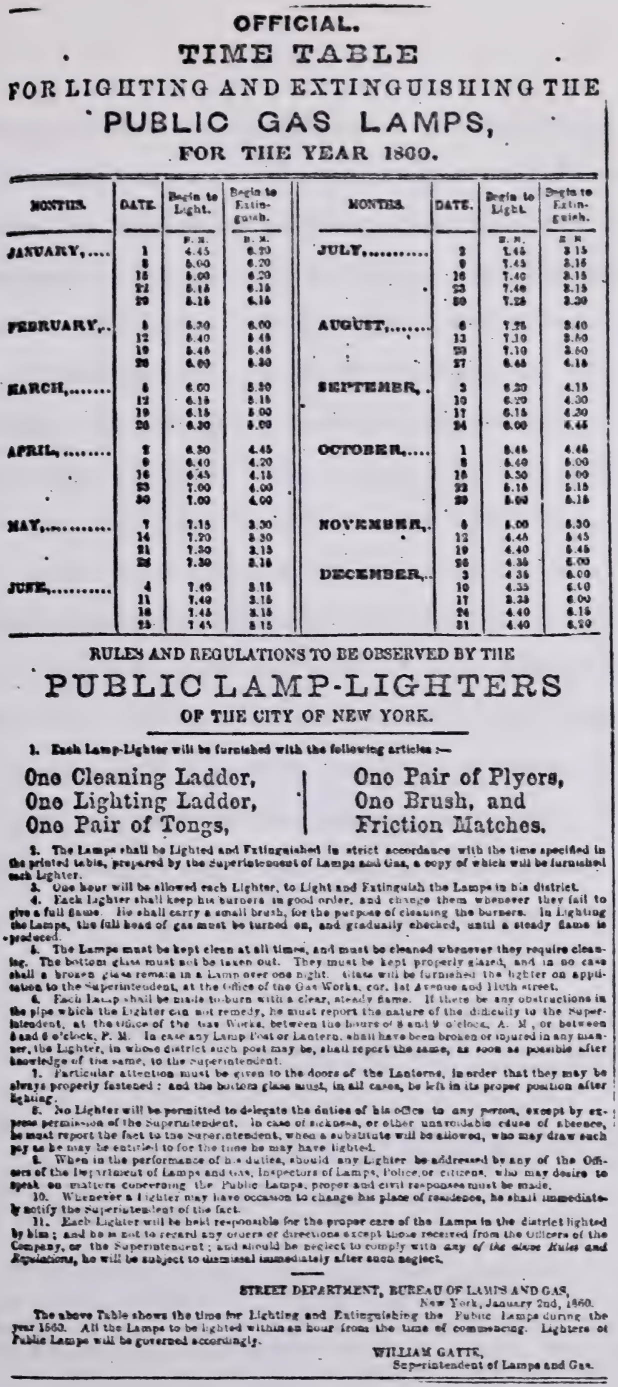
[49] Communication from His Honor the Mayor, Fernando Wood, to the Common Council, February 18, 1857, (New York: n.p., 1857), p. 10 (pamphlet).

[50] New York City Comptroller, Annual Report, 1863, p. 221; and Annual Report, 1864, p. 225.

[51] John J. Sturtevant, Recollections of a resident of New York City, n.d., MS in the files of the New York Public Library. Sturtevant reference is to an oil lamplighter. Their tasks were similar (except for the trimming and cleaning of wicks) to those of the gas lamplighter; see also Charles Dickens, Reprinted Pieces: The Lamplighter; To Be Read at Dusk; and Sunday Under Three Heads (New York: Charles Scribners Sons, 1899), pp. 281-82.



OFFICIAL.

TIME TABLE

FOR LIGHTING AND EXTINGUISHING THE PUBLIC GAS LAMPS,

FOR THE YEAR 1860.

MONTHS.	DATE.	Begin to Light.	Begin to Extinguish.	MONTHS.	DATE.	Begin to Light.	Begin to Extinguish.
		P. M.	A. M.			P. M.	A. M.
JANUARY,....	1	4.45	6.30	JULY,..........	2	7.45	3.15
	8	5.00	6.20		9	7.45	3.15
	15	5.00	6.20		16	7.40	3.15
	22	5.15	6.15		23	7.40	3.15
	29	5.15	6.15		30	7.25	3.30
FEBRUARY,..	5	5.30	6.00	AUGUST,.......	6	7.25	3.40
	12	5.40	5.45		13	7.10	3.50
	19	5.45	5.45		20	7.10	3.50
	26	6.00	5.30		27	6.45	4.15
MARCH,.......	5	6.00	5.30	SEPTEMBER, .	3	6.30	4.15
	12	6.15	5.15		10	6.20	4.30
	19	6.15	5.00		17	6.15	4.30
	26	6.30	5.00		24	6.00	4.45
APRIL, ...	2	6.30	4.45	OCTOBER,....	1	5.45	4.45
	9	6.40	4.20		8	5.40	5.00
	16	6.45	4.15		15	5.30	5.00
	23	7.00	4.00		22	5.15	5.15
	30	7.00	4.00		29	5.00	5.15
MAY,............	7	7.15	3.30	NOVEMBER,.	5	5.00	5.30
	14	7.20	3.30		12	4.45	5.45
	21	7.30	3.15		19	4.40	5.45
	28	7.30	3.15		26	4.35	6.00
				DECEMBER,..	3	4.35	6.00
JUNE,...........	4	7.40	3.15		10	4.35	6.10
	11	7.40	3.15		17	4.35	6.00
	18	7.45	3.15		24	4.40	6.15
	25	7.45	3.15		31	4.40	6.20

RULES AND REGULATIONS TO BE OBSERVED BY THE

PUBLIC LAMP-LIGHTERS

OF THE CITY OF NEW YORK.

1. **Each Lamp-Lighter will be furnished with the following articles :—**

One Cleaning Ladder,	One Pair of Plyers,
One Lighting Ladder,	One Brush, and
One Pair of Tongs,	Friction Matches.

2. The Lamps shall be Lighted and Extinguished in strict accordance with the time specified in the printed table, prepared by the Superintendent of Lamps and Gas, a copy of which will be furnished each Lighter.

3. One hour will be allowed each Lighter, to Light and Extinguish the Lamps in his district.

4. Each lighter shall keep his burners in good order, and change them whenever they fail to give a full flame. He shall carry a small brush, for the purpose of cleaning the burners. In Lighting the Lamps, the full head of gas must be turned on, and gradually checked, until a steady flame is produced.

5. The Lamps must be kept clean at all times, and must be cleaned whenever they require cleaning. The bottom glass must not be taken out. They must be kept properly glazed, and in no case shall a broken glass remain in a Lamp over one night. Glass will be furnished the lighter on application to the Superintendent, at the Office of the Gas Works, cor. 1st Avenue and 11th street.

6. Each Lamp shall be made to burn with a clear, steady flame. If there be any obstructions in the pipe which the Lighter can not remedy, he must report the nature of the difficulty to the Superintendent, at the Office of the Gas Works, between the hours of 8 and 9 o'clock, A. M., or between 5 and 6 o'clock, P. M. In case any Lamp Post or Lantern, shall have been broken or injured in any manner, the Lighter, in whose district such post may be, shall report the same, as soon as possible after knowledge of the same, to the Superintendent.

7. Particular attention must be given to the doors of the Lanterns, in order that they may be always properly fastened : and the bottom glass must, in all cases, be left in its proper position after lighting.

8. No Lighter will be permitted to delegate the duties of his office to any person, except by express permission of the Superintendent. In case of sickness, or other unavoidable cause of absence, he must report the fact to the Superintendent, when a substitute will be allowed, who may draw such pay as he may be entitled to for the time he may have lighted.

9. When in the performance of his duties, should any Lighter be addressed by any of the Officers of the Department of Lamps and Gas, Inspectors of Lamps, Police, or citizens, who may desire to speak on matters concerning the Public Lamps, proper and civil responses must be made.

10. Whenever a Lighter may have occasion to change his place of residence, he shall immediately notify the Superintendent of the fact.

11. Each Lighter will be held responsible for the proper care of the Lamps in the district lighted by him ; and he is not to regard any orders or directions except those received from the Officers of the Company, or the Superintendent ; and should he neglect to comply with *any of the above Rules and Regulations*, he will be subject to dismissal immediately after such neglect.

STREET DEPARTMENT, BUREAU OF LAMPS AND GAS,
New York, January 2nd, 1860.

The above Table shows the time for Lighting and Extinguishing the Public Lamps during the year 1860. All the Lamps to be lighted within an hour from the time of commencing. Lighters of Public Lamps will be governed accordingly.

WILLIAM GAYTE,
Superintendent of Lamps and Gas.

Figure 6 Time Table for the Public Lamps, 1860

up for their guidance. According to the rules and regulations which often appeared in public journals,[52] each lighter was expected to follow an official timetable for the lighting and extinguishing of the public lamps. The table was laid out by months and weeks. Each lighter was given one hour, from the appointed time, in which to light all the lamps in his district. In the performance of his duties, he was furnished with one cleaning ladder, one lighting ladder, one pair of tongs, one pair of plyers, one brush and friction matches. Lamps were lighted individually by means of a torch or by friction matches, although, as the century wore on, ladders were dispensed with in favor of long rods which could be used to light lamps from the ground,[53] and eventually, by systems of automatic ignition based on electricity.[54] The lighters were responsible for seeing to it that their lamps were kept in good repair, and that a clear steady flame was produced. Very often, the frustration of the private citizen,

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[52] "Official Time Table for Lighting and Extinguishing the Public Gas Lamps," American Gas-Light Journal, I (February 1, 1860), 149.

[53] "Lighting Street Lamps," American Gas-Light Journal, III (September 16, 1861), 92; and "Barlett's Paten 'Illuminating Street Lamps'," American Gas-Light Journal, XIII (October 3, 1870), 97.

[54] "Lighting Street Lamps," American Gas-Light Journal, XV (August 17, 1871) 53. The use of electricity to ignite gas is successfully in operation in Washington, D.C., and should be tried for New York's street lamps, was the advice given in an article which had appeared earlier in the American Artisan.

in regard to a deficiency in the light provided by the public lamps, resulted in exchanges with the lamplighter. In such instances, the regulations warned the lighters to make "proper and civil responses."[55]

New Yorkers, by 1870, boasted of their 300 miles of paved streets and the 19,000 gas lamps which illuminated nearly 700 miles of streets, avenues and squares. The brilliance of the public lamps helped give the city an air of movement and restlessness which invited comment by those seeking to describe the essence of an era.[56]

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[55] "Timetable for the Public Lamps," p. 149.

[56] Robert Shackleton, The Book of New York (Philadelphia: Penn Publishing Co., 1928).

CHAPTER X

CONSUMER REVOLT

The depression of 1837 dealt New York City a severe blow. Mayor Aaron Clark described the atmosphere of the city as one of "general gloom."[1] The value of real and personal estate which had shown continuous increase in the previous decade abruptly reversed itself and went into a decline which lasted until 1843.[2] By 1845 a rapid recovery had taken place and the progress of the city was being described as "amazing."[3] Growth in the next decade and a half surpassed anything experienced previously. Whereas the average rate of population growth in the period 1820 to 1860 amounted to 28 per cent, the average rate of growth between 1845 and 1860 equalled 31 per cent. The greatest advance was made between 1845 and 1850 when total population in New York City showed an increase of 38 3/4 per cent. By

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[1] Proceedings of the Board of Aldermen, vol. XV, p.10.

[2] D.T. Valentine, Manual of the Corporation of the City of New York, 1860 (New York, 1860), p. 225.

[3] I.N.P. Stokes, The Iconography of Manhattan Island, 1498-1909, vol V (New York: R.H. Dodd, 1926), p. 789.

1850 the city's population exceeded 500,000; by 1860 it was well over 800,000.[4] By mid-century New York was established both physically in terms of its relationship to surrounding areas and by reputation in the literature of the period, as a metropolis. The population of areas within a five-mile radius of the City Hall was considered to be a part of the growing city and here the growth rate figures were double those of the city proper.[5] By 1860 the population of the metropolitan area was over a million people.[6] The bulk of this growth within the city occurred in the area above 14th Street. In 1845, before the great surge forward, 15 per cent of the city's population lived in this area; by 1860, 42 per cent of all New Yorkers were north of this dividing line.[7]

The decade and a half prior to the Civil War not only witnessed great advances in New York's gas light facilities but it was also the era in which consumer hostility to the gas companies reached its climax. Much of the conflict revolved around the question of gas rates charged private consumers and most of it was directed against the New

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[4] [Winslow R. Martin], The Growth of New York, (New York: George W. Wood, 1865), p. 10 (pamphlet).

[5] Ibid., p. 10. The cities of Brooklyn, Williamsburgh, and Jersey City are included.

[6] Ibid.

[7] Ibid., p. 11.

York Gas Light Company operating in the area below Grand Street. By 1839 the company's rates for gas had declined from the original rate of $10 to $7 per 1,000 cubic feet of gas. The Manhattan rate at this time was $4.[8] Both companies added charges for the rental of meters which came to about 16 cents per month.[9] Letters and articles in the daily press testified to signs of incipient rebellion which seemed to become more intense as the 1840's progressed. The New York Herald in 1843 publicly inquired as to when consumers complaining of exorbitant charges would hold a public meeting to organize protests to the State Legislature. "It is time to move."[10] Several months later, the Herald again spoke of feelings of discontent aroused by the conduct of the gas company and repeated its call for an investigation. "Let this matter be made a question at the polls for the election of assemblymen next fall."[11] A critic, "Dry Goods," asked the editors of the Tribune to explain why so many stores were giving up the use of gas and returning to oil and camphene lamps. "Although I am willing to give a decided preference to Gas, yet I am fearful unless there is some

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[8] See Appendix A.

[9] A.H. Elliott, A Rapid Review of Gas Manufacture in the City of New York for the Past Fifty Years (New York: By the author, n.d.), p. 40 (pamphlet).

[10] December 27, 1843.

[11] June 18, 1844.

reduction in price or change somewhere I will be compelled to abandon it."[12] The Tribune responded: "During the last year our Gas cost us about $1,000 and finding that it increased every month, we were compelled to abandon its use. We cannot inform "Dry Goods" why this is so, but we wish it were not so."[13]

Was it rumor or was it fact when the city press printed in January, 1846, a statement indicating that certain retail dry goods stores had been offered free gas if they would keep their stores open one or two hours later each evening.[14] Those who accepted the report as true accused the New York Gas Light Company of interference with agreements reached among city merchants and of posing a threat to the welfare of the laboring population. The company was quick to disavow any activities of the kind alleged.[15]

Frequent comparisons were made between gas rates in New York and those of Philadelphia. The history of the gas supply in the latter city presented a startling contrast. Although Philadelphians had played a vital role in the introduction of gas lighting in this country, having produced working gas plants in the Peale museum in Philadelphia and

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[12] January 24, 1845.

[13] Ibid.

[14] New York Tribune, January 15, 1846.

[15] Ibid., January 20, 1846.

Baltimore in 1816, public opposition to the construction of gas works on account of the dangers presented had delayed the introduction of gas light into Philadelphia until 1836.[16] According to the plan worked out by the Select and Common Councils of the city, the corporation responsible for the gas supply was to be managed by 12 trustees appointed by the councils. Capital for the construction of a gas works and operation of the company was raised by the sale of stock to private individuals to the amount of $100,000. In the late 1830's when this gas plant went into operation, private consumers were charged $3.50 per 1,000 cubic feet with a discount of 5 per cent on all bills paid within three days of presentation.[17]

In the face of persistent unfavorable comparisons and criticisms, the Manhattan company decided in 1851 to send two chemists in Philadelphia to report on the methods of gas manufacture and the quality of the gas produced. The emissaries, issuing their reports in the summer of 1851, stressed the superior quality of New York's gas over that of its "sister" city. It was said that 162 cubic feet of

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[16] Ellis Paxton Oberholtzer, Philadelphia; A History of the City and Its People: A Record of 225 Years (Philadelphia: S.J. Clarke Pub. Co. [1912]), p. 66.

[17] J. Thomas Scharf and Thompson Westcott, History of Philadelphia, 1609-1884, vol. I (Philadelphia: L.H. Evarts and Co., 1884), p. 645.

Philadelphia gas yielded an intensity of light equal to 100 feet of New York gas so that the citizens of New York were actually, despite appearances to the contrary, paying a lower rate.[18] Both New York gas companies, however, lowered their rates in January, 1852 to $3 per 1,000 cubic feet. The reasons for this reduction and others which were shortly to follow becomes more apparent as we turn attention to developments among gas consumers of the city. The late 1840's and early 1850's saw the emergence of a full blown organization of gas consumers. This group was able to bring much pressure to bear against the companies and paved the way for the development of the first successful attempts at state regulation of public service corporations.

The immediate cause of consumer unrest was the issue of renegotiation of contracts for the gas companies which came to the fore about 1847 when the Common Council, in order to advance the pace of public street lighting by gas, decided to grant the Manhattan company a new contract. The earlier agreement with the Manhattan on May 8, 1833 had set a rate of $15 per lamp in the area between Grand Street and 6th Street. Now that the part of the city above 6th Street stood in such dire need and since the council was reluctant to order public gas lamps unless new rates were clearly agreed

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[18] New York Daily Times, January 6, 1851. The gas companies in New York And Philadelphia were both based on the manufacture of coal gas.

upon, the Aldermen with little delay worked out a new contract to go into effect on May 1, 1848.[19]

The Manhattan was to receive $15 for lighting and extinguishing the public lamps from Grand Street to 42nd Street. An additional $5.00 per lamp was paid the company for the fitting up of the lamp posts; but the cost of posts, lanterns and repairs was to be at the expense of the city. The municipal government now had the right to require the mains of the company to be extended to "such points as they may direct commencing at Grand and Canal Streets . . . to an amount not exceeding the sum of six thousand dollars in any one year."[20]

By 1848 the Manhattan was the leading gas company in the city and the largest in the nation. It enjoyed a reputation and solicitude not accorded its rival. The committee of aldermen appointed to report on a new contract in 1847 characterized the Manhattan's relationship with the city under the old contract as "liberal and honorable" and showed no hesitation in urging its renewal.[21] The company's growth had been spectacular during its first ten years of operation (1836-1846). The production of illuminating gas in 1846 was

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[19] New York City Street Commissioner, Semi-Annual Report, June 30, 1865, p. 7.

[20] Proceedings Approved by Mayor, vol. XV, pp.381-83.

[21] Commercial Advertiser, October 19, 1847.

37 million cubic feet. The company utilized 16 inch and 18 inch street mains, the largest in the country. Its gas works on 18th Street and 10th Avenue contained the world's largest gas holders (storage tanks), capable of storing 400,000 cubic feet of gas.[22] In 1847 the company secured legislative approval from the state for an expansion of its right to issue capital stock, and in August 1948 offered the public $500,000 in stock at $10 a share, an issue which was eagerly received and rapidly disposed of by New York investors.[23]

The New York company was equally profitable but its relationship with the public and the municipal authorities had deteriorated. Its problems arose in part from its role as a pioneer gas company. Its rate policies and the locations of its gas works reflecting decisions of an earlier decade were clearly inadequate by the end of the 1830's. The gas plant at Hester and Center streets was an eyesore and a nuisance to the dense population surrounding it. Complaints about odors and heavy smoke were brought to the attention of the Common Council.[24] The company decided to build a new works along the East River in the area north of Grand Street and to use "transit" mains to convey gas from

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[22] New York Tribune, December 22, 1846.

[23] Ibid.

[24] Proceedings of the Board of Aldermen, vol. XVIII, p. 233.

that plant to its gas district. Application was made to the council in the spring of 1837 for permission to lay a transit main. The council obliged with the understanding that within one year a new works would be built in the area above 25th Street. The wording of the resolution implied that the gas works in operation at Centre Street would be removed during the same period.[25]

The untimely occurrence of the depression of 1837 caused a revision of the company's plans. The building of a new plant was postponed and the old gas works continued to operate. Pressure against the company mounted in the spring of 1838 and several resolutions were passed calling for demolition of the Hester Street building. The company selected a location between Seventh and Eighth streets along the East River for a new site. Several aldermen insisted, however, that the proposed plant be located north of 30th Street, and inability to reach a decision shelved further action.[26] When the subject was again referred to in January, 1838, citizens of the 11th Ward (site of the proposed new plant) presented a remonstrance with 1,277 names against the proposed gas works.[27] The petitioners argued that a gas works in the neighborhood would cut property values by more than one-half

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[25] Proceedings Approved by Mayor, vol. IV, p. 210.

[26] Proceedings of the Board of Aldermen, vol. XV, pp. 385-86.

[27] Proceedings of the Board of Assistant Aldermen, vol. XIII, p. 97.

and that a gas business was being established at the expense of the neighborhood.[28]

The company, thus being forced to abandon the site on Eighth Street, purchased a new property between 21st and 22nd streets, west of Avenue A and near the margin of the East River.[29] By 1842 the foundations for the new plant were begun, but the work of construction proceeded very slowly as the company's Board of Directors hesitated to make investments during a period of economic retrenchment. Five years passed before the works and transit mains were completed.[30]

Before the new works could begin to operate an important decision had to be made concerning the type of gas to be manufactured. The New York company had begun operations in 1825 with oil gas and converted to rosin in 1827. Now it had to consider whether it should continue rosin or convert to coal as the substance from which gas was to be made. A Committee of Advice, appointed to investigate the matter, obtained estimates of the cost of manufacturing gas from coal in the cities of Baltimore, Philadelphia and New York and reluctantly concluded that the works on 21st Street should

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[28] New York Daily Times and Commercial Intelligence, January 25, 1839.

[29] Walter V. Clarke, Research into the real estate activities of the early gas-light companies on Manhattan Island. MS in the files of the Consolidated Edison Company, n.d., p. 36.

[30] New York Gas Minutes, p.203 (January 28, 1842).

be prepared for the manufacture of gas from coal.[31] Meanwhile, the municipal authorities fumed and fretted and attempted by legal means to force the company to vacate its plant on Hester Street. Mayor Havemeyer could only transmit to the council in 1845 the assurance of the president of the company that the Hester Street works would be abandoned as soon as the works on 21st Street were able to take over production of the supply of gas.[32] Three years later, fate intervened in the form of a fire which broke out at the Hester Street works, on August 30, 1848, and demolished a good portion of the plant. Workmen engaged in the repair of a gas holder had allowed one of the candles they were using to fall into a tank. Nine thousand feet of gas exploded. Enormous clouds of dense black smoke covered the area. According to the Tribune, the scene was one of the "most terribly sublime we have ever witnessed . . . the mighty columns of [flame] . . . gave an impression of lurid grandeur not often experienced this side of Vesuvius."[33]

The city that night was thrown into confusion. People stumbled through darkened streets falling into holes and colliding with objects. Establishments operating by means of private plants used the occasion to operate their gas lamps

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[31] Ibid., p. 238 (January 17, 1848).

[32] Courier and Enquirer, September 9, 1845.

[33] New York Tribune, August 31, 1848.

at fullest intensity, whether to aid passers or to fill them with envy was not clear. Among establishments so fortunate were the Broadway Theatre and the Astor House. Shopkeepers in Broadway were said to have requisitioned every available camphene and spermacetti lamp for the emergency.[34] The destruction of two gas holders in the fire forced a diminution in the supply of gas. As the damage from the fire was repaired, further difficulty was suffered by consumers in the fall and winter of 1848 caused by the large scale construction of sewers. The New York company found its mains and pipes deranged, and gas service was halted to carry out repairs.[35]

The new plant at 21st Street had now to be rushed to completion and the flow of gas from uptown to the area below Grand Street was begun early in 1849. By February, the company announced a rate reduction of $1 and promised further reductions as soon as operations were completely transferred from Hester Street to 21st Street. In August, the rates were lowered to $5, by November 1849 to $4. After 10 years of having maintained a uniform rate of $7, the drop in gas rates by 40 per cent during 1849 had an effect opposite to that intended. It was generally bruited about that the

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[34] Ibid.

[35] New York Sun, December 21, 1848; Courier and Enquirer, November 21, 1848.

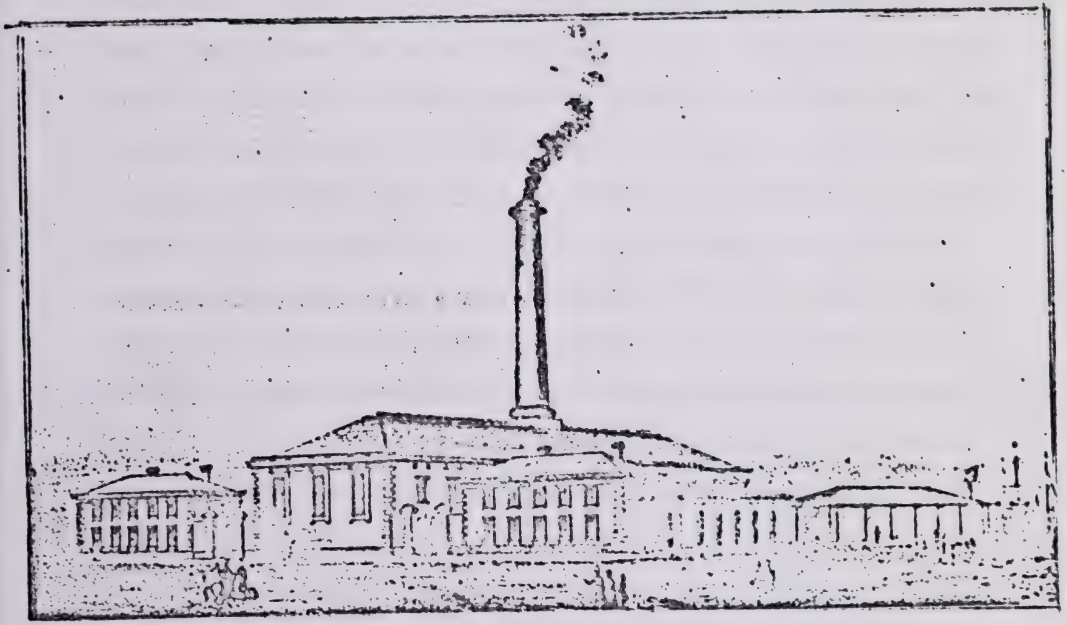

Figure 7

The Twenty-first Street Works

This plant, built by the New York Gas Light Company, in 1842 used coal gas. It began operations in the early months of 1849. Rosin gas was discontinued at the Hester Street Plant on October 27, 1850. Coal gas was used exclusively by New York City gas companies until the 1870's.

decreases were an open admission that prices had been too high and profits in excess for the previous decade.[36]

Many New Yorkers complained that the economies realized by the company in its conversion from rosin gas to coal gas had not been passed along to the consumer. As one explanation in the press put it; "coal gas has only half the density of rosin gas and consequently ought to be only half the price." The true price of coal gas, it was said, should have been 35 cents per 100 cubic feet rather than the 50 cents which the company had announced.[37] What relationship there was between the density of gas and its quality as an illuminant was not explained. Accusations were also made that the ability to maintain regular dividends while rates were lowered was a further sign that rates were still too high.[38]

The mystery surrounding the issue of rates for gas light was never better demonstrated than in the winter of 1849-1850 when consumers began to complain that despite rate reductions, charges for gas were exorbitant. The New York Tribune gas bill in October, 1848, was $102 paid for at the rate of $7.00 per thousand cubic feet. A year later, in

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[36] Louis Stotz and Alexander Jamison, History of the Gas Industry (New York: n.p., 1938), p. 45.

[37] Journal of Commerce, September 10, 1849.

[38] Stotz and Jamison, Gas Industry, p. 45.

October, 1849, with a rate of $5.00 per thousand cubic feet, the bill amounted to $173.15.[39] Cries of fraud and trickery were heard. The proprietor of the American Museum, P.T. Barnum, joined in the outcry against the company. Comparing his gas bills of October, 1848, and October, 1849, he found the latter to exceed the former by $128 in spite of the rate reductions and the fact that fewer burners were now used, because of substituting oil for transparencies, instead of gas which was formerly used.[40]

The reduction by the New York company of its gas rates had been carried out in an attempt to create a more favorable image in the city. The company was seeking to emulate the success achieved by the Manhattan in winning a 19-year contract under improved conditions. A resolution presented to the Board of Aldermen in June 1849 stressed the benefits to the upper city growing out of the new arrangements with the Manhattan and stressed the need for similar improvements in lighting the lower wards.[41] In little more than a month, the council had before it a proposed new contract with the New York company under which the company would receive $15 per year for the supply of gas to the

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[39] Journal of Commerce, September 10, 1849.

[40] New York Tribune, November 17, 1849.

[41] Proceedings of the Board of Aldermen, vol. XXXVII. p. 267.

public lamps.[42] The foes of the company succeeded in delaying further consideration while public opposition was given an opportunity to grow. In the fall, it was announced in the press that the Board of Assistants wanted all complaints against the New York Gas Company forwarded to them.[43]

The press was divided on the issue. The New York Sun cautioned against undue haste in granting a contract to last 19 years to a company charging the city 50 per cent more than they should and supplying a poor quality of gas as well.[44] The Courier and Enquirer saw as a benefit of a new contract an opportunity for the city to require the New York company to lay new gas mains to amount of $6,000 a year (a provision in the Manhattan contract) and thus to bring light to city streets lacking it. The sooner a new contract was executed, the sooner would the lower half of the city be more adequately lighted.[45]

Out of the commotion arose an attempt to form an organized consumers movement whose origins may, in part, be traced to the activities of an Englishman, W.A. Kentish. In 1842, Kentish had called public attention to the fact that

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[42] Proceedings Assistant Aldermen, XXXIV, 376-77.

[43] Unidentified news clipping in the files of Con. Ed., ca. fall 1849.

[44] November 15, 1849.

[45] December 5, 1849.

New York was sadly lagging in the provision of gas light. Kentish expressed surprise that so many shops and private houses in the city were using dangerous camphene for lighting when they should be using gas. He laid the responsibility for this to high gas rates and criticized the practice which allowed the gas companies to manufacture their own meters. He argued that companies should never be allowed to "manufacture their own machines to measure out the article they make and deal in exclusively."[46] According to his own report, Kentish had been active some years earlier in a consumers' movement in the English city of Birmingham. When the two gas companies of that city had acted in concert to maintain high gas rates, Kentish and others threatened the organization of a gas consumer's company. Allegedly, this had frightened the older companies into granting a 25 per cent reduction in gas rates. Now, in 1842, Kentish proposed a similar campaign for New York. An effort was made to form a New York Portable Gas Company whose announced function was to supply the public with more brilliant light at one half the cost.[47] Several public meetings of the new company and its organizers were held in the spring of 1845 to raise capital and to explain the intended manner of operations.

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[46] New York Herald, October 10, 1842.

[47] New York Herald, January 31, 1843. An attempt to form a similar company in 1825 had failed. See chapter VII above.

Portable gas cylinders were to be supplied to every house. Each cylinder would contain 100 cubic feet of gas which could be replenished when exhausted in the same manner as "soda cylinders."[48] The meetings were far from dull. On at least one occasion, several gentlemen present asked Kentish questions "irrelevant to the objects of the meeting and apparently with a view to embarrass him," but the latter replied in a courteous manner. B. Bates, a supporter of the new company, expressed the hope that nothing would be said to "wound the feelings of the gentlemen connected with the Gas Companies of this city, for he believed they were conducted by honorable and excellent men." If portable gas could be sold at a cheaper rate than stationary gas, an honorable competition would be created. Bates concluded by saying that he was in favor of "cheap lights, cheap ferries, cheap travelling, cheap literature and cheap postage."[49] But the movement to obtain cheap gas by means of portable cylinders faltered, most probably because of inability to raise the sum of $20,000 required as an initial investment.[50] It did not outlast the spring of 1845.

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[48] New York Herald, March 21, 1845.

[49] Wall Street Reporter and Jeffersonian Republican, April 2, 1845.

[50] Ibid.

Kentish's name reappeared in the bitter newspaper debates of the fall of 1849 over the question of a new contract for the New York Gas Light Company. He denounced the New York company's rate decreases as a fraud and personally gave notice that if the corporation were to "wink" at the enormities projected, he would call meetings and "agitate the subject until this evil and a great many others are remedied."[51] Voices were raised in the city for the creation of a city owned gas company which would supply the citizens of New York with gas as they were now being supplied with Croton water. Such a municipally-owned company had been suggested as early as 1836,[52] and on various occasions throughout the years, but it was now discussed with greater seriousness than ever before. By purchasing works already erected and supplying gas to the citizens, it was estimated according to one account that enough profits would be made to pay all city expenses.[53]

Early in January, 1850, several New York papers carried notices of a public meeting to be held at the Broadway House on January 8, for the purpose of forming a Gas Consumers Company to supply gas to the citizens at one half

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[51] Journal of Commerce, September 10, 1849.

[52] Proceedings of the Board of Aldermen, vol. XI,p.354.

[53] New York Times, November 18, 1849.

the price presently being paid the New York Gas Light Company.[54] The meeting that followed was well attended. After the formalities of electing a chairman had been concluded, Kentish rose to explain the objectives for which the meeting had been called. He spoke of the extortions and abuses the citizens had been subjected to by the New York company and compared the price of gas in the city with that of Philadelphia. Gas rates in the latter city were 22 1/2 cents per 100 cubic feet, a price almost half that paid in New York. At this juncture, Kentish was interrupted by a gentleman who demanded to know if he was a citizen of the United States. The speaker was about to make a further denunciation of Englishmen who came to the United States from poor manufacturing districts of Birmingham when he was interrupted with the cry of "servant of the gas company." As he attempted to continue, he was further interrupted by a voice which declared, "This meeting was called by gas consumers . . . . We don't want to hear any native American speeches here." Applause and approbation greeted the last speaker and the quarrelsome interrupter was finally silenced.[55]

Among the step taken by the gas consumers at this meeting was the formation of a committee to draft resolutions

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[54] Journal of Commerce, January 4, 1850; New York Herald, January 7, 1850.

[55] New York Herald, January 9, 1850.

requesting the legislature to investigate the affairs of the city gas companies. The meeting concluded with an address by Professor Grant who explained a discovery he had made by which the city could be lighted at a "five thousandth part of the expense now incurred." The principal ingredient of the new process was nitrate of soda which was found in inexhaustible quantities in South America. A light based on the new process and set atop a house on Broadway and Canal Street "would enable a person to read throughout the whole of the street and neighborhood."[56]

This and other meetings held by gas consumers in January, 1850 created a tide of agitation within the city. The "frauds" of the gas companies were exposed daily by the crusading press. The Herald spoke scornfully of wild projects which were being discussed by the municipality while the real needs of the citizens were neglected. "Of such projects the enlargement of the battery is the most impudent and the most reckless and atrocious. . . . As to building a bridge to connect New York and Brooklyn, and constructing a railroad on Broadway on the ground, over the ground, or under the ground, they are merely the emanations of crack-brained enthusiasts, and as such, may be dismissed with a smile and forgotten." But while these ridiculous schemes

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[56] Ibid.

were being considered, not a word about the "abuses . . . practiced on our citizens by the gas monopolies."[57]

The consumers' movement gained momentum in 1850. In the reports of a series of meetings held that January, the names of aldermen, assistant aldermen and ex-aldermen were seen with greater frequency. Edward J. Mercer of the Board of Assistants was elected chairman of the group. He played an active role in the Common Council as part of the opposition to the New York company's attempt to gain a contract and he was instrumental in organizing the support of all the gas consumers in the city behind a plan to force the formation of a light department in the municipal government. Petitions for this purpose were circulated by two persons within each of the 18 wards of the city.[58] The consumers' meetings occasionally became slightly chaotic in the heat of discussion over the best methods of manufacturing gas, once the proposed consumer's gas company should begin operations, or indeed whether a separate company was to be organized. Some wished it to be understood that they were not in favor of a separate company but merely expressed a desire to have the present companies reformed. By the end of January, 1850, a permanent Gas Consumers Association was

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[57] January 13, 1850.

[58] Morning Express, January 24, 1850.

set up. Alderman Mercer was elected President.[59]

One of the first tasks undertaken by the new association was to circulate in each ward of the city a petition to be presented to the Common Council opposing renewal of the contract with the New York Gas Light Company (or with any other company, for that matter) and asking instead that a new municipal department be created to manufacture and distribute gas light in the city. The consumers' petitions contained 6,000 names which it was estimated represented two-thirds of New York's 9,000 consumers of gas (those who used gas in places of business or in private homes).[60]

The New York Gas Light Company kept a careful eye on these developments. Defenders of the company writing frequently under the name of "stockholder"[61] addressed letters to the press refuting the contentions of the consumers. In February, the company announced a rate reduction which became effective in May, lowering gas rates to 35 cents per 100 cubic feet, or the price currently being charged by the Manhattan.[62] It was later revealed that a mysterious lobbyist had been paid $3 a day for a period of 250 days to prevent the consumers' movement from being given a sympathetic audience by the Common Council. It was alleged that this

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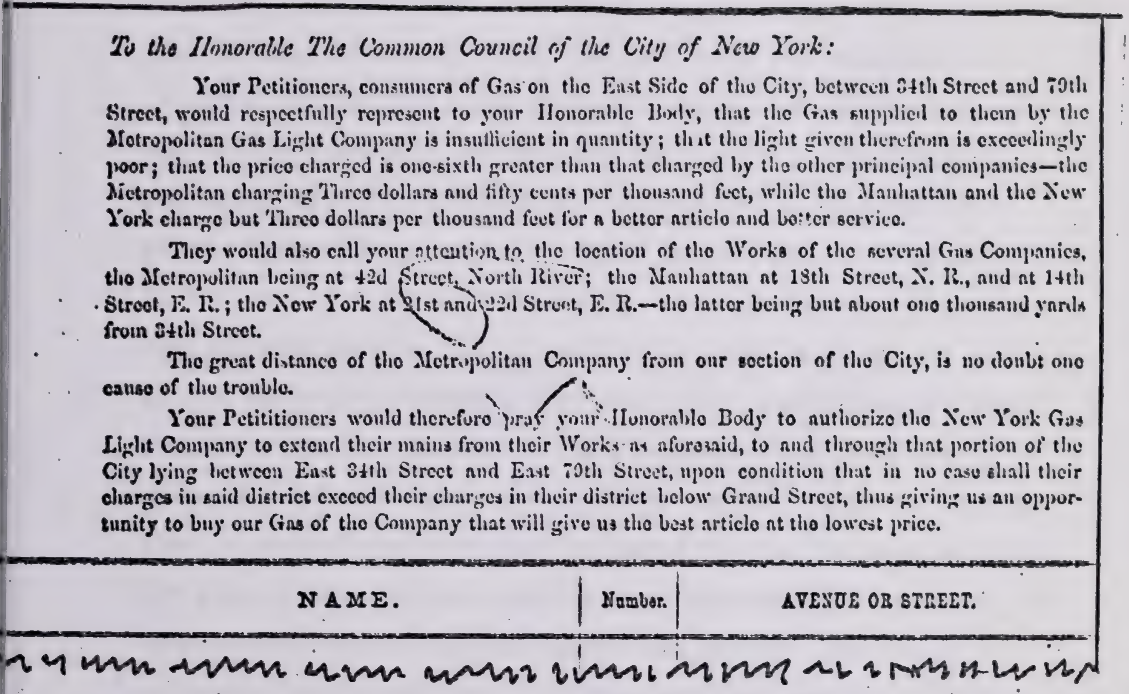
[59] Scientific American, V (February 9, 1850), 165.

[60] Morning Star, April 17, 1850.

[61] Courier and Enquirer, January 23, 1850.

[62] New York Sun, February 26, 1850. See Appendix A.



To the Honorable The Common Council of the City of New York:

Your Petitioners, consumers of Gas on the East Side of the City, between 34th Street and 79th Street, would respectfully represent to your Honorable Body, that the Gas supplied to them by the Metropolitan Gas Light Company is insufficient in quantity; that the light given therefrom is exceedingly poor; that the price charged is one-sixth greater than that charged by the other principal companies—the Metropolitan charging Three dollars and fifty cents per thousand feet, while the Manhattan and the New York charge but Three dollars per thousand feet for a better article and better service.

They would also call your attention to the location of the Works of the several Gas Companies, the Metropolitan being at 42d Street, North River; the Manhattan at 18th Street, N. R., and at 14th Street, E. R.; the New York at 21st and 22d Street, E. R.—the latter being but about one thousand yards from 34th Street.

The great distance of the Metropolitan Company from our section of the City, is no doubt one cause of the trouble.

Your Petititioners would therefore pray your Honorable Body to authorize the New York Gas Light Company to extend their mains from their Works as aforesaid, to and through that portion of the City lying between East 34th Street and East 79th Street, upon condition that in no case shall their charges in said district exceed their charges in their district below Grand Street, thus giving us an opportunity to buy our Gas of the Company that will give us the best article at the lowest price.

NAME.	Number.	AVENUE OR STREET.

Figure 8. . Gas consumers petition, 1865

individual had prevailed on committees of the Common Council to disregard the consumer petitions and had persuaded them to draw up a report recommending a renewal of the New York company's contract for 21 years.[63]

Until January, 1850, the aldermen and assistant aldermen had inclined toward a favorable view of the proposed new contract because of the need for improved lighting in the lower city. The Board of aldermen noted that the part of New York City lying below Grand Street was, as compared to the part above that street, "in total darkness." They ascribed the better conditions in the upper part of the city to the favorable contract negotiated but a year earlier with tho Manhattan Gas Company. For the purpose of securing "more and better light" in the lower wards, the board at that time, directed the Committee on Lamps and Gas to draw up terms for a new contract with the New York company.[64] The Board of Assistant Aldermen was also preparing to take favorable action. The Assistants' Committee on Lamps and Gas, after a study of the contract submitted to it by the aldermen, issued a report on January, 1850, which included a table purporting to prove that New York paid less for the gas used in the public gas lamps than other major cities on the Atlantic seaboard

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[63] New York Herald, November 16, 1850.

[64] Proceedings, Aldermen, XXXVII, p. 267 (June 13, 1849).

This table did not compare gas rates or the flat charge per lamp per annum but instead was couched in terms of actual cost based on the number of hours lamps were in use and the number of feet of gas consumed per hour. The Baltimore Gas Light Company, for example, received $10.00 per lamp while the cost of gas consumed was $23.00 per annum. The $15.00 proposed for the new contract with the New York Company was allegedly equal to actual cost.[65] During the debate, Mercer had opposed the renewal. He expressed the hope that before 19 years had passed, the city would have its own establishment for gas. A majority on the board, however, favored the new contract and hoped that the proposition to have the city take over the lighting of the public lamps would be defeated; "it would cost $2 to $3 where it now costs $1."[66]

This favorable attitude was affected by the rise of the consumers movement in January. Now debate on the contract proposals before the assistant aldermen took an unexpectedly bitter turn that reflected the opposition in the city. Criticisms were made of the long-term nature of the contract. The company's defiance of public opinion in the past was recalled. An alderman cited the embarrassment of the butchers who were forced to open their stalls in early

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[65] Proceedings, Assistants, XXXVI, pp. 337-345 (Jan. 5, 1850).

[66] Tribune, January 7, 1850.

morning darkness because the gas lights had been extinguished too early. Assistant Alderman Griffin called attention to the great value of the stock issued by the New York company as he added: "Some of the citizens of my own Ward own stock and have asked me to vote for this contract, but in justice to the public, I do not feel that I can do so."[67]

The petitions from the consumers group were presented to the meeting of February 18, 1850 in a most dramatic manner. One by one, the aldermen for each ward arose to present petitions with hundreds of signatures requesting the annulment of the contracts of both companies and the creation of a city department to supply gas.[68] The council now appointed a committee of five to report on the matters for which the signatures had been gathered. The report which took ten months to complete was finally submitted on December 11, 1850.[69] The committee's report provided a lengthy and reasoned defense of the gas rates charged by the New York companies. According to the report, gas provided in New York was either cheaper than that of other cities, or when not cheaper, far superior. The ability of English companies to produce a gas at a lower price was explained by reference to a number of factors; the greater cost of coal which had to be imported, the cheapness

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[67] Ibid.

[68] Proceedings, Aldermen, XXXVIII, 192-195 (February 18, 1850).

[69] Documents of the Board of Aldermen, vol. XVII, part 2, Doc. No. 78.

of British labor, the existence of a large market for the coke by-product in England and the use of cheaper grades of coal giving an inferior light. The committee saw no gain in providing for city ownership. The city could not hope to manufacture gas at the price now being paid to the companies. Among the advantages of speedy approval of the contract would be the opportunity to provide $6,000 annually for main laying, as well as the immediate lighting (before November, 1851) of West and South streets, thereby finally providing gas light for the piers and docks—a matter of unusual urgency at this time.[70] On the basis of this report and taking advantage of the slumber into which the consumers movement had apparently fallen, during the months from February to December while the report had been in the process of preparation, the council acted quickly and both boards had indicated approval by December 20.[71]

Mayor Caleb S. Woodhull now assumed the unexpected role of deus ex machina and submitted a veto of the contract proposals to the stunned Common Council.[72] The Mayor pointed out that the present contract with the New York company had

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[70] Documents of the Board of Aldermen, vol. XVII, part 2, Doc. No. 78.

[71] Proceedings, Aldermen, XL, 623-626 (December 19, 1850); Proceedings, Assistant Aldermen, XL,513-518 (December 20, 1850).

[72] Proceedings,Aldermen, XL, 697-700 (December 31, 1850).

two years and four months to run. The city was paying for each burner or lamp lighted by them only a sum equal to the annual average cost for lighting the oil lamps in the year previous. The new contract would raise the price to the city. Mayor Woodhull could not see why the"present grant should be abandoned before its termination, and the more especially if such abandonment is to be attended with so heavy a loss to the city." Moreover, the mayor opposed long-term contracts, in view of the technological changes that might make such contracts obsolete. Stressing the point that the city should not be deprived, by long-term contracts, of the benefits of technological change, he wrote:

> This grant cuts off the city from all the advantages which may be derived from the aids of genius and science bearing on this subject, for the next eighteen years. New discoveries, either in the material from which gas is manufactured, or some new mode of illumination, or both, may produce a much better and cheaper light than that now contracted for, long before so many years have elapsed. And is it wise—is it just and reasonable—that the present Common Council . . . should so bind their legislative capacities by a contract of so long duration as to withhold from the people and deprive them of the advantages which new discoveries and improvements may give them.[73]

The Mayor's reference to "legislative capacities" emphasized another issue, the importance of safeguarding representative government. He opposed long-term contracts because they have the effect of removing public controls from

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[73] *Ibid.*

public properties and public obligations. He thought the lack of provisions in the proposed contract to repeal or modify privileges granted was detrimental to the interests of the city.[74]

Mayor Woodhull's veto was warmly greeted in the press and by the consumers. A meeting held at the Chinese Assembly rooms after the veto message passed resolutions condemning the actions of the Common Council and expressed in eulogistic terms approval of the Mayor. A movement was started to raise funds by contributions of $1.00 to present Mayor Woodhull with "some fitting testimonial" for his conduct in relation to the gas contract.[75] On the other hand, the Commissioner of Streets and Lamps, Colonel Herman Childs, in his annual report, chided the mayor for his veto and warned all concerned that even though the old contract still had three years to run, failure to renew would mean that the company would cease all main laying operations. It meant that the docks and piers would be left without gas light as well as other areas of the city which presumably were without gas mains. The commissioner rejected the contentions of those who urged that the city should take over the supply of gas as it had that of water. "Water is provided by our maker only to be turned down hill. . . . Gas can only be supplied by chemical operations requiring an immense amount of capital, agency and

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[74] Ibid., p.700. [75] New York Evening Post, January 9, 1851.

labor." The city should not create more departments nor increase the city's present army of laborers by going into the business of gas manufacture. He summed up contemporary philosophy concerning urban service when he said, "The Corporation should embark in no business that can be conducted by individuals or associate enterprise."[76]

A new attempt was now made, through a special committee established by the Board of Assistant Aldermen, to get approval for a new contract with the New York company.[77] The committee proposed that the principle of "exclusiveness," which had led to charges of monopoly in the past, be eliminated. It recommended that the city be given authority to monitor the quality and quantity of gas light supplied by the company by the installation of "station meters." It would require the company to report at least once every three months on the quantity of gas supplied to the public lamps and private consumers. The company was to be prepared to surrender, on 90 days' notice, all their works and properties in return for compensation based on a fair valuation, and, finally, the proposed rate to private consumers would be $2.50 per 1,000 cubic feet.[78] This report was adopted by

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[76] Documents, Aldermen, XVIII, No. 6 (January 9, 1851).

[77] Proceedings, Assistant Aldermen, XLI, 236-8, (January 24, 1851).

[78] Documents of the Board of Assistant Aldermen, vol. XLIII, Doc. No. 12.

the Common Council and a contract embodying these recommendations was passed. In December, 1851, Mayor A.C. Kingsland vetoed the proposed gas contract on technical grounds. Under the recently amended city charter,contracts could not be awarded without public announcements and receipt of bids and estimates. Since this had not been done, the proposed contract was illegal.[79]

Party politics seem to have played an unimportant role in the series of events leading up to rejection of the New York company's contract. The aldermanic committee which recommended renewal (in the report submitted on December 11, 1850) consisted of three Whigs and two Democrats. The majority of the council in December, 1850 were Whigs as was Mayor Woodhull who vetoed the council's attempt to renew the gas constract. Edwin J. Mercer, a leading opponent of renewal and a leader of the gas consumers, was a Whig alderman for the Second Ward. Again in December, 1851, a Common Council composed mainly of Whigs found its will thwarted by a Whig mayor. The aldermen, in general, seemed less concerned with the charges against the New York company than they were about the need to extend gas lighting to the waterfront and other areas below Grand Street. Other considerations, such as the exertion of gas company influence on the aldermen, may be speculated upon, but documentation is lacking. The mayors, however, who were generally more

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[79] Proceedings of the Board of Aldermen, XLIV, 587-88.

responsive to public pressures, could not afford to ignore the intense opposition aroused in 1850 and 1851 by the gas consumers and the press to renewal of the gas contract.[80]

The mayoral vetoes effectively cancelled any further plan for continuation of the efforts by the New York company and its supporters to attain a contract. Consumer agitation had thus successfully deprived the New York company of a renewed franchise despite the company's impressive contribution to the development of gas lighting in the city. The fault seemed to lie in the company's indifference to the complaints of those whom it served. The second part of the consumers' program was more difficult of achievement. Despite a lengthy committee report to the Common Council on the benefits of a city owned and operated gas works (made by comparing the city-owned gas plants of Philadelphia with those of New York),[81] this solution aroused little enthusiasm in 1851. Public attention was focused rather on the declarations of inventors and other individuals who presented schemes for cheap and efficient methods of gas manufacture seeking to obtain the Gas Consumer Association's backing for a gas light company.

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[80] The political affiliations of aldermen and mayors for 1850 and 1851 may be determined by consulting Valentine, Corporation Manual, 1854, pp. 516-523.

[81] Documents of the Board of Aldermen, vol. XVIII, part 1, Doc. No. 25, pp. 495-542.

Most prominent of these was S.A. Paine. He had announced in 1848 the discovery of a new scientific principle, that "electricity" possessed the qualities of "weight, compressibility and gravitation" and that water was a simple elemental substance which could be decomposed by electrical currents (using Paine's machine) into hydrogen gas.[82] Paine attended the meetings of the gas consumers in January, 1850, and sought to convince the group of the efficacy of his "hydro-carbon" gas for the lighting of the city. There were often sharp exchanges between Paine and opposing inventors which, to the dismay of the consumers, often disrupted and divided those present.[83] At a time when the major gas companies in New York were charging $3.50 and $4.00 per 1,000 cubic feet, Paine pledged to produce gas which would cost the consumer 40 cents. The Scientific American[84] and prominent New Yorkers[85] endorsed the truth of Paine's statements but there were many in the city who considered him a fraud. The city was sharply divided on the issue and a committee of individuals prominent in the gas light industry was formed to resolve the matter. Charles H. Roome, engineer of the Manhattan Gas company (and later its president), John Torrey,

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[82] New York Tribune, June 8, 1848.

[83] Morning Express, January 3, 1850.

[84] New York Evening Post, April 3, 1850.

[85] Courier and Enquirer, April 4, 1850.

a well known and respected chemist of New York City, and J.H. Blake, engineer and chemist of Boston, journeyed to Worcester, Massachusetts, in 1850, to examine Paine's equipment first hand. They returned to express grave doubts which did much to deflate Paine's standing. He was eventually exposed as an imposter in the pages of the *Scientific American*,[86] a journal which had at first strongly supported him. By 1854 the absurdity of Paine and his process had been fully demonstrated.

Abram Longbottom attracted attention in 1851 by announcing the successful production of inexpensive gas from a "carbonized liquid." He was said to have received orders to furnish his apparatus for lighting the Bowery Theatre, Barnum's Museum and other establishments.[87] Abram Gesner's attempt to interest the city in the possibilities of kerosene gas in 1850 and 1851 has been mentioned earlier.[88]

The most ambitious attempt, however, to find a substitute for the old-line gas companies was the projected formation, in 1853, of a privately owned gas company which would manufacture and distribute gas light under the complete control of municipal authorities. Capital for the venture would be raised by the sale of stock to consumers who were to

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[86] *Scientific American*, . V (June 14, 1851), 310.

[87] *Commercial Advertiser*, February 5, 1851.

[88] See Chapter VIII above.

receive their gas light at the rate of $2.12 per thousand cubic feet (the established companies were charging $3.00) while the non-investing consumer would be obliged to pay $2.50. These rates were to be independent of any dividends realized by stock-holding consumers.[89] The proposed company was incorporated as the New York Mutual Gas Light Company in September 1852 and its application for a municipal franchise was favorably received in March, 1853.[90] Before final agreement could be reached, the Manhattan Gas Light Company appeared before the Board of Aldermen to challenge the right of the Mutual Gas company to a franchise on the ground that its plans for the manufacture of gas were faulty. The Common Council was forced into a series of lengthy hearings, extensively reported in the press in May and June of 1853, to examine the validity of the Manhattan's charges. The Mutual's pledge of cheap gas had been based on "discovery" of a new process. Under methods of manufacturing gas then in use, a retort (the chamber in which the distillation of coal took place) could maintain continuous operation for only four hours after which the accumulation of tar and waste

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[89] New York (City) Board of Aldermen, Committee on Lamps and Gas, Proceedings . . . on the application of the New York Mutual Gas Light Company for permission to lay pipes through the streets of the City, and for a contract to light the street lamps... (New York, 1853), p.5 (pamphlet).

[90] Proceedings of the Board of Aldermen, vol. XLVIII, p. 352.

products forced a halt. The Mutual contended that some of the waste tar, or oil and rosin, could be fed into the retorts as "enrichers," enabling the retorts to operate for a longer time before being refilled. Great savings in fuel and time were predicted.[91] The Manhattan refuted these claims by providing the testimony of experts and former employees of the London gas works who testified that attempts to use a process similar to that described by the Mutual company were tried in London and found unsatisfactory. The economies which the Mutual and its supporters alleged would result from the new process were so strongly derided by gas engineers during the hearings that the council decided to halt consideration of the Mutual's request for a franchise,[92] and there the matter ended.

Shortly before the New York company's contract was to expire in the spring of 1853, the Commissioner of Streets and Lamps had, according to the terms of the new city charter of 1853, advertised for bids to light the portion of the city below Grand Street with gas light. The only estimate submitted was that of the New York company and they were asked to continue lighting the gas district for one year subject

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[91] "Cheap Gas for the City," Scientific American, VIII (January 1, 1853), 125.

[92] Committee on Lamps and Gas, Proceedings . . . New York Mutual Gas Company, pp. 49-55.

to the terms of the old contract. For the next quarter of a century, the contract of the New York company was renewed on an annual basis until a merger of gas companies in the city, in 1884, under the name of the Consolidated Gas Company of New York effectively disposed of the issue.[93] The consumers had thus failed in their efforts in the early 1850's to have the city take over the provision of gas or to establish an opposition company organized and managed by consumers. However, they had prevented the award of a long-term new contract to the New York Gas Light Company. Moreover, opposition gas companies, organized and financed by private capital, were soon to make their appearance.

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[93] Stotz and Jamison, Gas Industry, p. 60.

CHAPTER XI

OPPOSITION GAS COMPANIES

A third gas company for the city arrived from an unexpected quarter. In 1848, the New York State Legislature passed a general act to authorize the formation of gas light companies. Any three or more persons wishing to form a company for the manufacture and supply of gas to cities, villages and towns were merely required to file a certificate before a designated county official stating the name of the company, its objects, the amount of capital stock, the terms of its existence (not to exceed fifty years), the number of shares to be issued, the names of the directors and the place in which the operations of the company were to be carried on. The company was also required to gain the consent of appropriate municipal authorities for the privilege of laying mains in public streets.[1]

In February 1855, five New Yorkers filed a certificate announcing the formation of the Harlem Gas Light Company to manufacture and distribute gas light in New York City above

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[1] Laws of the State of New York, 1848, chap. 37.

79th Street. The group included Henry P. McGown, a lawyer and active citizen of the Harlem community whose name appeared, in the early 50's, on several petitions to the Common Council seeking civic improvements for the village; and Burr Wakeman, another resident of the Harlem area, a former dry goods merchant who had become president of the Lafayette Bank and was to be elected first president of the Harlem Gas Light Company.[2] The charter was granted for a period of 50 years, and stock to the amount of $150,000 was announced as a first issue.[3] Almost simultaneously with the filing of the necessary certificate of incorporation, the Harlem company addressed a petition to the Common Council seeking permission to lay mains in the area above 79th Street. The petitioners noted that permission to lay gas mains did not at that moment extend beyond 50th Street and asked for "exclusive" rights to conduct their business, contending that the introduction of gas would greatly improve

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[2] The certificate of incorporation for the Harlem Gas Light Company has been reproduced in Documents of the Board of Assistant Aldermen, vol. LIV, Doc. No. 18. pp. 7-9. In addition to McGown and Wakeman, signers included Walter Brady, Lemuel Arnold and John M. Reed. Petition to the Common Council bearing McGown's name may be found in Documents of the Board of Assistant Aldermen, vol. XLV, Doc. No. 4 and Proceedings of the Board of Assistant Aldermen, vol. LIII, p. 264. Further biographical details of Burr Wakeman in New York Times, July 10, 1879 (obit. notice).

[3] Documents of the Board of Aldermen, vol. LIV, Doc. No. 18.

real estate values and add to the convenience of the residents in the northern part of the city.[4]

News of the new company was warmly greeted by the residents of the villages of Harlem, Yorkville, Manhattanville, Carmanville and Bloomingdale, all lying wholly or partly in the area described.[5] The built-up portion of New York in 1855 extended to 34th Street, after which residential structures were scattered as far north as 42nd Street. Beyond that point settlement took the form of a collection of small communities and villages. In 1845 the New York and Harlem Railroad operated a line of tracks that extended from City Hall in lower Manhattan to White Plains in Westchester, passing through Harlem and Yorkville on the way. Cars left the City Hall for Harlem every hour and charged a fare of 12 1/2¢.[6] Steamboats provided an additional link with the lower city. Harlem's modest population of 1,500, in 1846, began to grow, and moves were made by some of the area's residents to attract industry and new people to the village. Harlem was described in one newspaper account as an ideal area for the "working and laboring classes wishing to settle themselves in New York at moderate rents, to a much greater

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[4] Ibid., p.2.

[5] I.N.P. Stokes, The Iconography of Manhattan Island, 1498-1909; vol. III (New York: R.H. Dodd, 1924), p. 657.

[6] Ibid.

extent . . . than in any other place on this island."[7]

Previous agreements between the city and the Manhattan company had given the latter the right to lay gas mains in any part of the city above Grand Street but the company chose to ignore the northern areas because of the distances involved. Residents of the northern villages had to be content with having their streets lighted by the oil lamps brought from downtown areas as gas lamps were installed in the lower part of the city.

In 1855, the streets north of 79th Street were lighted by some 700 oil lamps poorly attended to and often inoperative as a result of vandalism and neglect. It was said of those who lived in the area that they walked the streets at night guided only by habit and instinct. That there were not more reports of violent crimes and robberies was held to be due to instincts of self preservation of the Harlem residents who abstained as much as possible from "outdoor peregrination after sundown."[8]

The Harlem's petition for a municipal grant or franchise in February, 1855 was referred to the Committee on Lamps of Gas of the Board of Councilmen[9] where in spite of

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[7] New York Evening Post, April 12, 1852.

[8] Journal of Commerce, March 27, 1855.

[9] The Board of Assistants was reorganized as the Board of Councilmen between 1854 and 1868.

general agreement on the desirability of the new company, delay occurred over the company's wish to have an "exclusive grant." The corporation counsel in a communication to the committee affirmed their right to make such a grant, should they choose to do so, under the terms of the new city charter but specified that such a grant would then have to be sold at public auction.[10] A contract without this privilege (of exclusive rights) was then drawn up by the committee and sent to the council for approval. On April 25, 1855 the terms of agreement with the Harlem Gas Light Company received the approval of the mayor and the Common Council and passed into law.[11]

The new agreement reflected many of the issues raised in the previous decade in the interest of consumer demands. The company was required to furnish gas to all who desired it and was not to deprive any consumer of gas upon his refusal to pay because of a dispute over the amount of the bill "until they have served such disputant with the affadavit of their inspector as to the correctness of the register of their meter."[12] The city reserved the right to purchase at any

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[10] Documents of the Board of Assistant Aldermen, vol. LIV, Doc. No. 18, p.10.

[11] Proceedings Approved by the Mayor, vol. XXIII, pp. 150-153.

[12] *Ibid.*, p. 151.

time the pipes, fixtures and real estate of the company by paying the company "the cost of the same and ten per cent over and above said cost." The company was given two years within which to begin the supply of gas, and upon the showing of proof that the Harlem company had failed to comply with the terms of the agreement, the entire grant might be revoked.[13] No provision was made at this time for the supply of gas to the public lamps.

The first meeting of the Board of Directors of the Harlem company took place in May, 1855. A committee was immediately appointed to correspond with the builders of gas works and gas apparatus to ascertain the costs of equipment, as well as the costs of laying mains in the streets.[14] At a later meeting, a committee of two was appointed to search out a good location for a gasworks.[15] This committee recommended purchase of a portion of the Roosevelt property bounded by 110th and 111th streets, between the Harlem River and First Avenue.[16] The deed for the property was acquired from the company board member Andrew McGowan for $63,000.[17]

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[13] Ibid.

[14] Minutes of the Harlem Gas Light Company, p.1 (May 1, 1855). Hereafter to be designated as Harlem Gas Minutes, MS in the files of the Consolidated Edison Company.

[15] Ibid., p.2 (June 11, 1855).

[16] Ibid., p.4 (July 11, 1855).

[17] Walter V. Clarke and J.H.G. Pierson, Real estate activities of the early gas-light companies on Manhattan Island, MS in the files of the Consolidated Edison Company, p.102.

The committee on construction of the works reported back in February, 1856. S.R. Dickson of Pennsylvania originally agreed to build the gas works and mains for $150,000, of which $25,000 was payable in cash and the balance in the stock of the company. The final agreement provided for the construction of the works for the sum of $143,000, of which $18,000 would be in cash and the remaining $125,000 in stock.[18] Dickson notified the directors some four months later that he had assigned the contract to William Bucknell of Philadelphia, an arrangement which seemed to be acceptable to all parties concerned,[19] and construction of the new works was begun in the summer of 1856. Early in 1857, a retort house and a small telescopic gas holder were completed and the supply of gas to residents north of 79th Street was begun February 25, 1857.[20]

The reaction of Harlem and Yorkville residents in the spring of 1857 is typified by the following: "With no sidewalks, no graded roads, and no lights to shine on the pathways, we were delighted when gas was lit for the first time [in private homes and establishments] from Fifty-ninth to Eighty-sixth Street."[21] The first mains were laid on

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[18] Harlem Gas Minutes, pp.7-8 (February 21, 1856).

[19] Ibid., p.13 (June 6, 1856).

[20] Ibid., p.27 (March 9, 1857).

[21] Hopper Striker Mott, The New York of Yesterday; a descriptive narrative of old Bloomingdale... (New York: G.P. Putnam's Sons, 1908), p. 431.

Third Avenue from Seventy-ninth Street to the Harlem River and, according to a contemporary account, through most of the streets in Harlem and Yorkville which had been graded and had curbs erected.[22]

The superintendent of the new gas works was to be Jacob M. Long who had been hired in the fall of 1856 at the salary of $1000 a year to be paid from the time the works began operation.[23] Long was well known in engineering circles for his work in connection with the laying of water pipes for small towns in eastern Pennsylvania.[24] Announcements made in January, 1857, to the residents of Yorkville, Harlem and other parts of the district that the company would supply gas at $4.00 per thousand cubic feet created a flood of complaints that rates were too high. The directors then decided to reduce the price to $3.50.[25] By June of 1858, the company found itself in a difficult position. The capital raised by stock sales had almost all been used up by April, 1858.[26] The company was having great difficulty collecting the large sums of money owed by consumers for the construction of

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[22] New York Daily Times, Feb. 17, 1857.

[23] Minutes of the Harlem Gas Light Company, p. 18 (October 14, 1856).

[24] J.H.G. Pierson, "Origins of the Consolidated Gas Company," (MS in the files of the Consolidated Edison Company), p. 181.

[25] Minutes, Harlem Gas Co., p. 23 (Jan. 15, 1857).

[26] Ibid., 47 (April 18, 1858).

service pipes connecting houses to gas mains. The directors took action to reverse company regulations so that in the future, no meters would be set or gas turned on until payment for service pipes had been made. Eight thousand feet of main had already been laid and an additional $9,000 was required to lay additional mains from 79th to 124th Street and 141st to 162nd Street in Bloomingdale Road (presently called Broadway). As receipts from gas consumers were insufficient, a loan for this amount was made at the Artisan's Bank.

The Harlem Gas Light Company may have been unique among American gas light companies at this time in that revenue from the public lamps represented a substantial portion of its income and acted as a stabilizing factor on the company's operations. The impatience of citizens in Harlem for gas street light had been such that petitions for gas street lamps in that area reached the council before the company had started to build its plant in the summer of 1856.[28] In a resolution passed in 1856, the council declared its purpose to have the company light with gas all the streets and avenues above 79th Street which were then lit by oil.[29]

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[27] Ibid., 50 (June 8, 1858).

[28] Proceedings of the Board of Assistant Aldermen, vol. LXIII, p. 310.

[29] Proceedings of the Board of Aldermen, vol. LX, p (Dec. 26, 1855).

In accordance with the provisions of the charter of 1853, the council publicly advertised for bids to light the city with gas above 79th Street.[30] Only the Harlem company responded, and it was duly given the right to contract for the supply of gas. The company then reached agreement with the Street Commissioner on November 6, 1857 to supply the public lamps for $28.80 per annum,[31] which was $3.00 more than was currently paid the other companies, an increase justified by the longer distances involved and the uneven terrain through which mains were laid. The progress of the company in providing the lamps was rapid. Some two and one-half years later, in June, 1860, the total number of public lamps lighted by the company was 2,340.[32] At this time the number of gas lamps in the territory of the New York Gas Light Company in the densely populated lower half of the city was approximately 3,000.[33]

The number of lamps in this part of the city caused a political scandal by 1860. Visitors to the Harlem area

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[30] Proceedings Approved by the Mayor, vol. XXIV,p.557.

[31] New York City Street Commissioner, Second Quarterly Report, June 30, 1865, p. 72.

[32] Proceedings of the Board of Assistent Aldermen, vol. LXXIX, p. 10.

[33] D.T. Valentine, Corporation Manual, 1856 and 1870. This is an estimate based on the constancy of figures given for period after 1856.

returned with stories of the unusual number of gas lamps erected in a sparsely populated area. In April and June 1860, the Board of Assistant Aldermen received resolutions calling for an examination of the methods used to light the upper portion of the city with a view to reducing the excessive number of lamp posts erected there. In the course of investigation, the Committee on Lamps and Gas visited Harlem and reported to the council that public gas lamps were more thickly placed in Harlem than in any street of the city proper.[34] This was even true of several streets where scarcely a resident could be found. The gas lamps remained in operation for 3,833 hours per year which was a much longer period than the 2,300 hours in effect in the territories of the New York and Manhattan companies.

The committee pointed out that Harlem, "with a scarce and remote population, bordering more upon the appearance of a small country village (where gas light is not thought of) requires her lamp-posts to be set nearer together than in the densest part of this Island," and that each lamp was lighted "1,533 hours and 20 minutes longer than those of the Manhattan District which is confessedly the densest portion of the city.[35] The committee cited the road leading to

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[34] Proceedings of the Board of Assistant Aldermen, LXXIX, 412.

[35] Ibid.

McComb's dam and the streets in the area which though ungraded and uninhabited was occupied by gas lamp posts as "plenty as trees in a forest."[36] It was apparent that the city contract was a major source of profit for the Harlem company. In 1860, it received $75,000 for its lighting services to the city. The value of the company's stock rose 25 per cent in the first six months of 1858,[37] and was continuing to rise. Annual dividends rose in 1859 to 7 per cent and continued at that level until 1865, after which in keeping with the general trend, the Harlem and other gas companies enjoyed a bonanza before being dampened somewhat by the depression of 1873.[38] According to the Committee on Lamps and Gas (of the Board of Assistant Aldermen) in 1860, the company repaid its original investment at least once every four years. They attributed this order of profit to the large sums being drawn from the city treasury to pay for "excessive" lighting services.[39] The committee called for

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[36] Ibid., p. 414.

[37] American Gas Light Journal, . I (July 1, 1859), . 5.

[38] See Appendix F in Pierson,"Origins Consolidated Gas."

[39] The responsibility for this state of affairs was later charged to Charles Devlin, Street Commissioner in 1857. The fraudulent and improper contracts being negotiated by Devlin at great expense and loss to the city were exposed when D.D. Conover succeeded Devlin in June 1857 as Street Commissioner. See Proceedings of the Board of Aldermen, vol. LXIX, pp. 97-100; also Stokes, Iconography, V, 1872-73.

a reduction in the number of lamp posts and the number of hours the lamps were permitted to burn. Hereafter the streets were to be lighted for 2300 hours annually (as in the Manhattan gas district) and an ordinance was proposed specifying the distances between lamps. Lamps not in conformity with the ordinance were to be withdrawn.[40] The stock of the company, however, continued to rise and its reputation in gas circles in 1863 was that of a progressive well managed company whose example might well be emulated by New York's remaining gas companies.[41]

The success of the Harlem company, oddly enough, seemed to arouse little opposition from the Manhattan although, technically, both shared, in part, the same gas district. Opposition gas companies were always bitterly fought,[42] but the Manhattan considered the area above 79th Street to be out of practical bounds as the technology of piping gas over long distances was, at that time, inadequate for the problem of maintaining gas at a constant pressure to distant consumers. In addition, the New York companies were subjected in 1855

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[40] Proceedings of the Board of Assistant Aldermen, vol. LXXIX, pp. 415-16. The proposed ordinance, however, was laid aside and no action taken.

[41] American Gas Light Journal, vol. IV (Jan 1, 1863), p. 195.

[42] Ibid. (May 15, 1863), p. 344. See the "sociological analysis" of the development of opposition gas companies in the American Gas Light Journal, vol. III (November 1, 1861), p. 136.

to a new wave of popular criticism (almost as great as the early 50's) when economy-minded forces began a determined attack on what was considered an unwarranted extension of lighting costs. In January, 1854, the mayor had approved a resolution authorizing the street commissioner to have the streets lighted every night from dark until daylight regardless of the state of the moon.[43] The Comptroller's report issued in the fall of 1854 indicated an increase in lighting costs of 50 per cent over the previous year to the amount of $100,000. In 1855, a motion was made in council to rescind the earlier resolution on the ground that the city was forced to bear an enormous expense in failing to take advantage of the "good and sufficient light" of the moon.[44] This move alarmed the Board of Directors of the Manhattan who authorized their president full powers to deal with the threatened retrenchment.[45] An aroused public opinion and the flood of petitions to the council defeated the proposals of the economy bloc.[46]

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[43] Proceedings Approved by the Mayor, vol. XXI, p.605.

[44] Proceedings of the Board of Assistant Aldermen, vol. LVIII, p. 101; Journal of Commerce, Jan. 15, 1865.

[45] Minutes of the Manhattan Gas Company, p. 51 (December 26, 1854). Hereafter to be designated as Manhattan Gas Minutes.

[46] Journal of Commerce, Jan 15, 1855; Proceedings of the Board of Assistant Aldermen, vol. LVII, pp. 230, 231, 234, 286, 287.

On February 7, 1855, a motion was introduced in the council to have the corporation counsel report on the steps necessary to have the city take over the mains, pipes, fixtures, works, etc., of the New York and Manhattan companies with the idea of creating a municipal gas department similar to the existing Croton Aqueduct Department.[47] The counsel's report, however, denied the city the right to appropriate private property without the consent of the owners.[48] A week later a motion was introduced in the council to reduce payments to the gas companies when lamps were not lit, as they were supposed to be, for the entire night. Despite the companies' explanations that winter cold blocked the flow of gas by condensation, charges were made that failure to maintain lights at night was deliberate.[49]

In March, 1855, one or more of New York's gas companies were rumored to be in Albany making efforts to have legislation passed increasing their allowances for the issuance of capital stock and real estate purchases. The council passed a resolution addressed to the state legislators warning them that with the powers of monopoly at present possessed by the New York companies, individual rights were

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[47] Proceedings of the Board of Assistant Aldermen, vol. LVII, p. 292.

[48] Ibid., p. 576.

[49] New York Enquirer, February 23, 1854.

by no means secure and asking the legislators to oppose all requests for legislation by the companies unless "ample provision is therein made for the protection of our city and our fellow citizens against imposition, extortion and oppression."[50] This touched a sensitive nerve and resulted in a letter of protest by the indignant directors of the Manhattan company to the Common Council. With 16,000 consumers, they declared, some complaints would of course be made but the company attempted to give such complaints prompt attention. They charged the city with having done the company a grave injustice. The privileges being sought at Albany were necessary if the company was to be able to raise additional capital to extend gas mains and supply gas lighting to remote areas.[51]

The state legislators insisted first on having detailed reports on the companies' financial condition.[52] Some legislators spoke of the need for a new company for New York City which would act as a "regulator" upon the New York and Manhattan monopolies. The Albany Times contended that in return for their requests, the New York and Manhattan

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[50] Proceedings of the Board of Assistant Aldermen, vol. LVII, p. 570.

[51] Manhattan Gas Minutes, pp. 55-7 (March 6, 1855); New York Herald, March 8, 1855.

[52] New York State Assembly Documents, vol. V, Doc. No. 123.

companies were obliged to agree to present no opposition to the incorporation of a new gas company for New York City.[53] In April, 1855, three gas company bills moved smoothly through both houses of the state legislature. On April 13, 1855, the New York Gas Light Company was given the right to purchase real estate not to exceed $500,000 in value. On April 17, 1855, the Manhattan was given the right to increase its capital stock to the sum of two million dollars, and on the same day the Metropolitan Gas Light Company was chartered with the right to manufacture and sell gas in any of the streets and buildings of New York City.[54]

There was an air of expectation in New York City. Was this the long awaited opposition gas company which might provide relief to the consumer? The situation in New York was compared with that in London where more than twenty gas companies were said to be in active competition with one another. It was contended in the Tribune for April 30, 1855 that the lack of competition in New York had led to exploitation of the consumer.[55] The press asked the public to

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[53] February, 16, 1856.

[54] Laws of the State of New York, 1855, pp. 776, 1038, 1039. James Bowen, leader of the group which formed the Metropolitan was president of the first Board of Police Commissioners in 1855 and a member of the state legislature in 1848 and 1849. See Appleton's Cyclopedia of American Biography, eds., James Grant Wilson and John Fiske, vol. I, part 2, p. 336.

[55] Daily Tribune, April 30, 1855.

sustain the new company so that it and other companies to follow would soon reduce the price of gas to "one of the cheapest articles of public use." The paper argued that the truce which prevailed at Albany would not be carried over to the city, and warned the supporters of the Metropolitan of the bitter opposition which was to be expected on the part of the established companies.[56]

Within the week, the Metropolitan petitioned the Common Council for the right to lay pipes in the streets.[57] The company claimed that they would furnish cheaper and better light than was presently available, that the measurement of gas would be accurate, the charges would be correct and the whole business would be transacted to the satisfaction of the public.[58] At a meeting of the Committee on Lamps and Gas to consider the Metropolitan's request, Charles Fox, president of the New York company, made an eloquent speech against the grant. His company had introduced gas light to the city when it was not known in the United States, and only partially in Baltimore. Large investments had been made to guarantee a supply of gas to the public lamps and private

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[56] Ibid.

[57] Proceedings of the Board of Assistant Aldermen, vol. LVIII, p. 322 (April 23, 1855).

[58] New York Tribune, June 11, 1855; New York Daily Times, June 11, 1855.

consumers. All streets within the district were now adequately supplied with gas mains. Introduction of another company would lead to trouble and expense. It would be difficult to detect leaks from double sets of gas mains in the same streets. European cities had found after much experience that the most satisfactory arrangement was to have gas companies in separate gas districts.[59] The older companies accused the Metropolitan's lawyer of pandering to popular opposition against monopolies. It would be to the disadvantage of the public to establish a competing company. Twice the amount of capital would be used to give the same degree of service presently available.[60] Counsel for the Metropolitan expressed his indignation. Why should the New York Company appear to oppose the grant; their rights were not being interfered with. The existing gas companies, the counsel continued, "held a monopoly, such as is not another in existence in the United States or throughout the world." Everyone lights his house or shop with gas. It has become a prime necessity and yet a city of seven to eight hundred thousand people has but two companies.[61]

When the committee completed its deliberations and reported to the council in the fall of 1855, much emphasis

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[59] New York Herald, July 20, 1855.

[60] Ibid.

[61] Ibid.

was placed on the waste which might be expected if a new gas company were franchised. The doubling of capital costs would result in burdens ultimately borne by the consumer. The committee warned the council against the illusion that competition would lower prices. "No confidence can be placed in the expectation that should a new company be established, a fair competition will prevail between that the the old companies. Such a state of things may exist for a short time, but the manifest interest of both companies would soon lead them to combine against their customers who would be compelled not only to pay rates covering the enhanced cost of production, but to indemnify both companies for their losses during the period of their active competition.[62]

But the committee was even more disturbed by the action of the state legislature in granting the Metropolitan a charter. Why had the company not made use of the general law of 1848 (as had the Harlem company)? The general law was intended to prevent the creation of monopolies as payment for political favors. Did the state propose by its grant to place new companies beyond the power of the corporation? Why had a provision been inserted in the act of incorporation which made the municipal franchise conditional on the approval of the Common Council only, thus depriving

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[62] Documents of the Board of Assistant Aldermen, vol. LV, Doc. No. 58.

the mayor of any voice in the matter? The committee strongly then advised against granting the Metropolitan the right to use the streets; to do so would be a sign of assent to a charter which was "subversive to the intent of the constitution of this state.[63]

In reacting to this report the Board of Assistants was bitterly divided. A majority wished immediate action in favor of the Metropolitan. A minority called for further study and deliberation. Days of protracted, exhausting and vociferous debate followed. The majority beat off all attempts at amendment. A motion to grant the Metropolitan's petition was finally carried in September, 1855 by a vote of 40 to 12.[64] The resolution was then sent to the Board of Aldermen for concurrence. That body had barely begun its deliberations when on the evening of October 4, a deputy sheriff appeared in the council chamber with a writ restraining the aldermen from granting the privileges requested. Among the grounds cited in the complaint was the allegation that the act of incorporation conferred on the new company rights placing it beyond the control of the corporation. It was claimed that the mayor and the Common Council were being

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[63] Ibid., p. 7.

[64] Proceedings, Assistant Aldermen, LIX, 778-784 (September 12, 1855).

disenfranchised in a manner forbidden by the state constitution.[65] The stockholders of the existing gas companies contended that the streets belonged to the corporation, consisting of the mayor and the Common Council. The state had required only the consent of the Common Council before a grant could be made. Moreover, it was contended that the company should have been incorporated, if at all, under the general law for the formation of gas companies.[66]

This injunction was dissolved and once again the Board of Aldermen attempted to take up the matter of the Metropolitan's franchise. This time, Charles Roome, president of the Manhattan company, appeared before the Committee on Lamps and Gas to voice the older companies' opposition. Again he stressed the danger to the city, the disruption of pavements and the likelihood of skullduggery when competing gas companies often repaired leaks by tapping each other's mains. The committee laid aside the Metropolitan's petition.

This opposition from the Board of Aldermen threw the Metropolitan's Board of Directors into despair. They no longer held regular meetings, and there were frequent resignations from the board.[67] But just as the president of the

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[65] New York Evening Post, October 5, 1855; New York Sun, November 12, 1855.

[66] New York Daily Times, February 22, 1856.

[67] Metropolitan Gas Minutes, Book A, May 14, 1856 and October 5, 1856. Entry following October 5, 1856 is marked

New York Gas Light Company was announcing to the directors of that company, in January 1857, that the Common Council had finally disposed of the Metropolitan's petition,[68] a rumor spread in the city that the Metropolitan was back at Albany attempting an alteration of the disputed charter.[69] Warned in time, the Manhattan's agents appeared in Albany to defeat the bill which would have given the Metropolitan the right to lay mains between 14th Street and 79th Street, thus appearing as a competitor only in the territory of the Manhattan company.[70]

Renewed activity by gas consumers in 1857 and proposed legislation early in 1858 to curb abuses associated with gas meters rekindled organized opposition to the gas companies and gave new life to the hopes of the Metropolitan. In June, 1858, both branches of the council approved a motion to give the Metropolitan the right to use the streets for its mains, in the Board of Councilmen (formerly the Board of Assistants), 16 to one,[71] and in the Board of Aldermen a vote

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June 24, 1858. Note: The minutes are found in two ledgers, Book A and Book B. Book A contains no page numbers and is referred to by date only. A slight overlapping in time exists since Book B was based on a reorganization of the company dated May 27, 1859 whereas Book A ends on January 20, 1860.

[68] New York Gas Minutes, p. 319 (January 19, 1857).

[69] New York Sun, January 23, 1857.

[70] Manhattan Gas Minutes, p. 112 (Feb. 23, 1857).

[71] Proceedings, Assistant Aldermen LXX (June 9, 1858), 1074.

of 9 to 7.[72]

But now Mayor Tiemann vetoed the bill. In his veto message he asserted that the corporate powers granted to the Metropolitan in 1855 had been forfeited when the company, in violation of state statutes, failed to commence operations within one year after incorporation.[73] More emphatic was the Mayor's contention that in approving the Manhattan's request, the council had failed to erect safeguards presently enjoyed by the city in relation to the contracts with the established companies. The Metropolitan had not been required to lay gas mains annually to a specified value ($6,000 in the case of the Manhattan) nor was there any control over where the mains would be laid (the Metropolitan's contract gave it access to all areas of the city) and consequently the company could easily ignore the upper sections of the city now crying for gas while building mains in densely populated areas where gas services already existed. The total effect would be to drive out competition and create a monopoly for the company in those areas deemed most profitable while increasing the cost of gas to the upper sections of the city.[74] In December, 1858, however, the mayor's veto was overridden by two-thirds majorities in the two boards of the Common Council,

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[72] Proceedings of the Board of Aldermen, vol. LXX, pp. 724-727.

[73] Proceedings of the Board of Assistant Aldermen, vol. LXX, pp. 1211-17.

[74] *Ibid.*, pp. 1215-17.

and the Metropolitan now had the right it had sought for more than three and a half years.[75]

However, before the Metropolitan could begin exercise of its franchise, the Manhattan Gas Company (with the agreement of the New York company) reappeared with a suit calling for dissolution of the Metropolitan on the ground that its corporate powers had expired through non-use in accordance with an argument raised by Mayor Tiemann. The suit moved from lower to higher courts where in the summer of 1859 the State Supreme Court rendered a decision in favor of the Metropolitan. The court held that the grant of "exclusive rights and privileges" did not create a monopoly but merely limited access to city streets. Anyone who wished to do so, could still sell gas light to homes, factories, etc. The court upheld the right of the legislature to grant a special act of incorporation despite the existence of a general law. It was entirely within the discretion of the legislature to determine whether the objects in mind could be better served by the special or the general form of incorporation. Nor had the company failed to use its corporate powers as alleged. A board of directors and a president had been elected and the company organized for practical operation within the prescribed year. The application to the Common Council for the

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[75] Proceedings of the Board of Aldermen, vol. LXXII, pp.828-29; Proceedings of the Board of Assistent Aldermen, vol. LXXII, p. 1047.

privilege of using the streets for gas mains represented, in fact, the commencement of the business of the corporation. Forfeiture for non-use of corporate powers was held not applicable.[76]

The uncertainties to which the Metropolitan Company had been subjected, had led during 1859 to many resignations from the Metropolitan's Board of Directors.[77] During the month of January, 1860, alone, there were 10 resignations and 10 elections to fill the vacancies.[78] Despite the confusion, a committee had been selected to find a site for a gas works, and the Board of Directors accepted a report on January 20, recommending purchase of 64 lots of land comprising the block bounded by 41st and 42nd streets and extending from 11th Avenue to the Hudson River.[79] The Board approved purchase for the sum of $125,000 and immediately drew up plans for the issuance of capital stock to cover the purchase and initial costs of construction. The Metropolitan's charter permitted capital authorization of up to two and a half million dollars, of which the directors decided to

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[76] *Courier and Enquirer*, July 23, 1859.

[77] Metropolitan Gas Minutes, Book B, p. 2 (May 27, 1859).

[78] Metropolitan Gas Minutes, Book A, (January 20, 1860).

[79] Minutes, Metropolitan Gas, Book A, January 20, 1860; and *American Gas Light Journal*, . I (Feb. 1, 1860), . 156.

utilize one and a half millions. An immediate issue of $500,000 was planned to obtain necessary working capital.[80]

In June, 1859, negotiations had begun with James Hoy Jr. and John P. Kennedy of Trenton, New Jersey, for the construction of a gas works. Payment was financed by an issue of $126,000 worth of capital stock to James Hoy and his associates.[81] In January, 1860, the contract was renegotiated and the value of a new works was set at $1,200,000 payable half in the stock of the company and half in monthly cash installments at an interest rate of 8 per cent.[82] Construction was begun the fall of 1860 and by October the Executive Committee reported the installation of piling for gas works at the foot of 42nd Street.[83] The company faced another setback when in February, 1860, legal challenges were resurrected in the New York State Supreme Court. This body reversed an earlier decision and invalidated the charter of the Metropolitan. In June, the Metropolitan took its case to the Court of Appeals in Albany where under the inspired pleading of its legal counsel, the charter was again upheld and all further legal claims or challenges to

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[80] Metropolitan Gas Minutes, pp. 13-19 (January 24, 1860).

[81] Ibid., Book A (June 1, 1859).

[82] Ibid., p. 63 (January 10, 1861).

[83] Ibid., p. 49 (October 10, 1860).

the company's existence were quashed with finality.[84]

By the spring of 1862, despite difficulties associated with the outbreak of the Civil War, the Metropolitan's gas works had progressed to the point of raising expectations among New York's consumers that an opposition gas company would be in operation by the end of the year. The company claimed for its gas district, the area between 42nd Street and 79th Street, the northern portion of the Manhattan's district.[85] The Manhattan, having been defeated in its efforts to have the charter of the Metropolitan invalidated in the courts, prepared for direct battle. In the fall of 1860, it had announced that it would no longer continue to charge consumers for the use of gas meters.[87] When the Metropolitan began to lay mains in the Manhattan's territory in the spring of 1862, the directors of the company toyed briefly with the notion of seeking an injunction to restrain the Metropolitan.[88] It was decided, however, to make a frontal attack by expansion of the Manhattan's gas mains in an area hitherto neglected. The Board decided

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[84] Ibid., p. 80 (April 30, 1860); pp. 84-86 (May 13, 1861); p. 106 (February 12, 1862).

[85] American Gas Light Journal, . I (February 1, 1860), . 156.

[86] Ibid., III (May 15, 1862), 344.

[87] Manhattan Gas Minutes, p. 179 (November 26, 1860); p. 181 (January 21, 1861).

[88] Ibid., p. 208 (June 23, 1862).

in the summer of 1862 to install a 20-inch gas main in 59th Street from 8th Avenue to 10th Avenue and then to branch out with a 6-inch main along 8th Avenue from 59th to 79th Street.[89] The Metropolitan had altered its original plan of confining itself to the area above 42nd Street and built mains east along 42nd Street (from the plant at 11th Avenue) to Ninth Avenue and then south toward Grand Street, the heart of the Manhattan's gas district. The Metropolitan's mains had already reached 23rd Street when under the initiative of Charles Roome, president of the Manhattan, conferences were held between directors of the opposing companies to work out a peaceful solution.[90] The laying of gas mains was abruptly halted as offers and counter offers were exchanged in the summer of 1862.[91]

The negotiations were complex and in the final analysis called for exchange of information which both companies considered highly confidential. At one point, the Metropolitan in frustration considered resumption of the battle of the mains but calmer counsel prevailed.[92] As conferences continued into the fall of 1862, attitudes within the city

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[89] Ibid., p. 210 (July 21, 1862).

[90] Pearson, "Origins Consolidated Gas," p. 209.

[91] Metropolitan Gas Minutes, pp. 138-9 (August 13, 1862).

[92] Ibid., p. 142 (August 25, 1862).

towards the Metropolitan began to change. When the company applied to the Common Council for permission to build a pier for their use on 41st Street and the Hudson River, former friends of the Metropolitan aimed their barbs at the company. The tribulations of the Metropolitan, they declared, were about to begin. "So long as it was considered an outsider—an opposition company—it stood high in the popular esteem, but now it has taken its position among the regulars, it must look out for occasional hard knocks."[93]

In the fall of 1862, the Metropolitan suggested as a compromise that the present gas district of the Manhattan be split into two parts giving each company a clear field of operations. This was at first opposed by the Manhattan[94] but eventually became the basis on which agreement was finally reached on June 24, 1863. By its terms, 34th Street was accepted as the dividing line between the two companies. The Manhattan sold its gas works, mains and other properties in the area between 34th and 79th streets to the Metropolitan, and the latter surrendered its mains south of 34th Street to the Manhattan. Each company agreed not to interfere or lay mains outside of its gas district. The Manhattan renewed the right, in the event of failure to

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[93] American Gas Light Journal, vol. IV (November 1, 1862).

[94] Manhattan Gas Minutes (September 11, 1862).

observe the agreement, to reconnect its mains to the Metropolitan's, north of 34th Street to assure a flow of gas to consumers in the area.

The price to the Metropolitan was $685,301.02, paid for partly by a five-year mortgage on the 65th Street plant to the value of $161,500 and partly by a transfer of stock from the Metropolitan to the Manhattan. The Manhattan received 2,356 shares with a par value of $1,178,000 but a market value of only half that amount. With the payment of a few thousand dollars in cash to the Metropolitan, the stock was accepted as payment for the total due.

Concurrent with these negotiations, the Metropolitan pushed completion of its gas works at 42nd Street. By June 15, 1863, the company's engineers reported readiness to begin the flow of gas.[95] On June 25, one day after successful conclusion of an agreement with the Manhattan, the Metropolitan began the supply of gas to consumers in its new district, becoming, in the process, New York City's fourth gas company. The island of Manhattan was now divided into four gas districts, the first occupying the area from the Battery to Grand Street (the New York Gas Light Company), the second from Grand Street to 34th Street (the Manhattan), the third from 34th Street to 79th Street (the Metropolitan) and the

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[95] Metropolitan Gas Minutes, June 17, 1863.

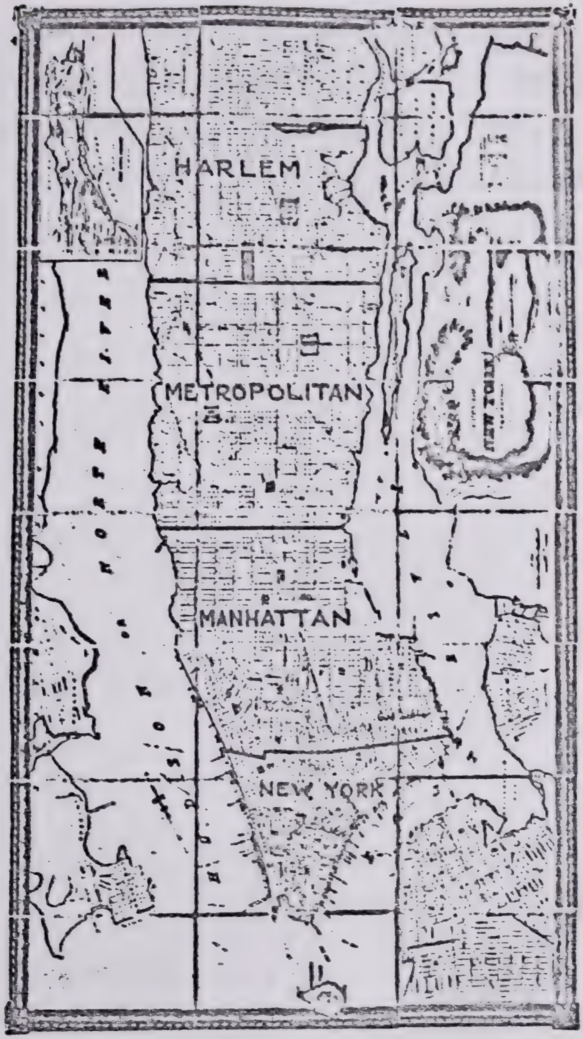

Figure 9

Gas Districts in Manhattan, 1863

last from 79th Street to Spuyten Duyvil (the Harlem). This division marked the end of an era and the beginning of a decade of peaceful and extremely prosperous exploitation of gas districts by non-competing companies. When a new challenger appeared in 1872, the era of peaceful development ended.[96]

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[96] The New York Mutual Gas Company chartered in 1866 was in operation in New York City by December, 1872. It had no fixed gas district but could lay mains and sell gas in any part of the city. See Frederick L. Collins, Consolidated Gas Company of New York (New York: Published by the Company, 1934), pp. 156-159.

CHAPTER XII

LIGHTS AND SHADOWS

By 1863, New York's gas companies had gained for the city undisputed national leadership in the production and distribution of illuminating gas. The federal census of 1860 had listed the total output of illuminating gas in the United States as 4 billion cubic feet with a value of $11 million.[1] (The census office, however, indicated its belief that the correct totals were nearer 5 billion cubic feet and $13 million.)[2] The total dollar value of New York City's output in illuminating gas (the physical quantities were not available) in 1860 was $3,784,000 or approximately 29 per cent of the total for the United States.[3]

New York, for all of its progress, was still in a secondary position as compared with London. By the mid

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[1] United States Census Office, Manufactures of the United States in 1860; comp. from the original returns of the eighth census... (Washington: Government Printing Office, 1865), p. 736.

[2] United States Census Office, Preliminary Report on the Eighth Census, 1860; comp. by Jos. C.G. Kennedy (Washington" Government Printing Office, 1862), p. 70.

[3] U.S. Census, Manufactures, 1860, p. 381.

1850's, London had 27 successful gas companies to serve a population of two and one-half million people, or one company to every 95,000 inhabitants. The cities of New York, Brooklyn and Williamsburgh with an aggregate population, at this time, of one million inhabitants, had only four gas companies, or one company to every 250,000 inhabitants. The total output of gas in London in 1861 was 8 billion cubic feet, twice the entire American output as reported in the census of 1860.[4]

During his visit to London in 1849, Charles Roome, engineer of the Manhattan Company, attempted to compare the gas in London with that of New York. He found London gas to be much inferior in illuminating power to the New York product although the advanced purification processes of London gave a cleaner gas.[5] The London companies produced a gas whose average candlepower came to about 13 while Americans at about this time were enjoying 16 to 17 candlepower.[6] On the other hand, Manchester and Liverpool supplied gas with 22 candlepower, which was considerably higher than that of New York. Scottish cities, including Edinburgh and Glasgow, burned a gas of 25 to 35 candlepower, far superior to that of

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[4] New York Times, September 8, 1856.

[5] Charles Roome to Henry Young, Esq., January 5, 1850, MS in the files of the Consolidated Edison Company.

[6] American Gas Light Journal, IV (February 2, 1863), 233.

both the English and American companies.[7]

Illuminating power depended principally on the type of coal used. The more expensive cannel coals gave a brighter gas but Newcastle coals and other less expensive forms of coals were introduced in order to lower costs. The London companies had concentrated on obtaining the greatest quantity of light at the least possible cost, hence the production of a gas with low illuminating power.[8] The cost of gas light was therefore substantially lower in London and other English cities than it was in New York and this in turn accounted for another major difference in gas lighting practices between the two cities. While the use of gas light in New York was restricted to the public lamps and the more affluent portions of the population, it was said that every working man in London could afford gas at a price equal to that paid in New York for oil, camphene or candles.[9]

The relatively high price paid for New York gas was the great failure of the New York companies and kept gas lighting from coming into general use for the lighting of

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[7] New York Times, September 5, 1867.

[8] Roome to Henry Young.

[9] New York Times, September 8, 1856. The estimated number of private gas consumers (domestic and commercial lighting) in New York City, in 1859, was eight per cent of the city's population. See Appendix B.

homes until the period 1865 to 1875.[10] The development of the kerosene lamp, the discovery of new sources and new methods for the acquisition of petroleum, as noted in an earlier chapter, provided a powerful competitor for gas.[11] As late as 1860, the use of gas for domestic lighting remained the privilege and luxury of the middle and upper classes.[12]

Despite these limitations, the institution of gas light had powerfully affected the minds and mores of the New York community. We may divide the process by which the city was illuminated by gas into several phases to cover the period from 1825 to 1863. Beginning in 1825, gas light was first presented as a unique form of illumination to New Yorkers. Its value was not immediately perceived. While some of the wealthy were listed in the gas ledger of 1826 of the New York Gas Light Company, many more remained wedded to the use of candles. The merchants who could afford to do so ordered gas light partly as a novelty to attract trade and

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[10] New York Sun, September 2, 1933. Also, The Story of Gas: A Brief Sketch of the Manufactured and Natural Gas Business (American Gas Association, 420 Lexington Avenue, N.Y.C. n.d.) (pamphlet).

[11] See chapter VIII.

[12] Edgar W. Martin, The Standard of Living in 1860: American Consumption Levels on the Eve of the Civil War (Chicago: University of Chicago Press, 1942), p. 114. See Appendix B for statistical verification of the limited use of gas light in major American cities.

only partly because of superior lighting qualities. Museums and pleasure gardens definitely used gas for its novelty and entertainment value. The Common Council hesitated and finally ordered 120 gas lamps for Broadway in 1827.[13] With the beginning of the thirties, the experimental phase was over. Enterprising investors in the city succeeded in the formation of a second gas company and by 1835, New York was being lighted in the area above Grand Street by the Manhattan Gas Light Company. Two companies now enjoyed a monopoly of gas lighting in their respective gas districts until 1855, when the Harlem Gas Light Company was incorporated and the Metropolitan Gas Light Company began its efforts to gain a municipal franchise.

The decade from 1836 to 1846 saw the slow growth and extension of gas mains northward to 34th Street. The depression of 1837 put a damper on rapid expansion and as late as 1840, the streets of New York were described as poorly lighted by gas and oil.[14] The late forties and early fifties saw a decisive change in the tempo. The Common Council under the stimulus of prosperity, increasing trade and commerce, and the growth of population, moved quickly to install gas lamps in streets and avenues. One barrier after another was

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[13] See chapter VI.

[14] John Bach McMaster, A History of the People of the United States; from the Revolution to the Civil War, vol. VII (New York: D. Appleton and Company, 1895), p. 75.

eliminated. Reliance on moonlight as a lighting agent was dispensed with, the gas lamps were kept in operation until dawn and the gas companies were asked to light all streets in their respective gas districts as soon as possible. And when in 1863, the Metropolitan began operations, New York had become a city lighted by gas. Romanticists were left to grieve over an earlier era of oil and to write elegies upon heaps of discarded hickory posts lying about in city yards or warehouses.[15]

How effectively was the city lighted? Pictures of city streets lighted by gas indicate irregularity and disparity in the placing of gas lamp posts.[16] Was it true as has been suggested that a municipal government could concentrate the light on what it was desirable to see and conceal the darker alleys and corners?[17] There is no more persistent theme for those who viewed the city in the fifties and sixties of the nineteenth century than the subject of light

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[15] Cornelius Mathews, A Pen and Ink Panorama of New York (New York: F.S. Taylor, 1853), p. 69.

[16] I.N. Phelps Stokes, New York Past and Present: Its History and Landmarks, 1524-1839 (New York: New York Historical Society, 1939). See also John Atlee Kouwenhoven, The Columbia Historical Portrait of New York: An Essay on Graphic History in Honor of the Tricentennial of New York City and the Bicentennial of Columbia University (Garden City, N.Y.: Doubleday, 1953).

[17] Roger Burlingame, Engines of Democracy: Invention and Society in Mature America (New York: Charles Scribner's Sons Ltd., 1940), p. 230.

and shadow, a contrast which may be said to contain moral as well as ecological implications. Sometimes the analogy is directly stated as in the titles of so many of the urban "travelogues" of mid-century: Robert H. Collyer's Lights and Shadows of American Life (Boston in 1844)[18] or George G. Foster's, New York By Gas-Light: with here and there a streak of sunshine (for the city about 1849),[19] Matthew Hale Smith's Sunshine and Shadow in New York (the city in 1868)[20] and James Dabney McCabe's Lights and Shades of New York (the city in the early 1870's)[21] and New York by Sunlight and Gas Light (for a somewhat later period).[22] More often the pattern of urban illumination was woven into the fabric of the anti-city novel or traveller's guide in which light played a more complex role. Gas light made possible the endless movement to and fro of multitudes in Broadway, the Bowery and other thoroughfares after night had fallen but the activities engaged in were often seen as "dark."

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[18] (Boston: Brainard and Co., 1844?) Descriptions of life, society and the appearance of New York City in this era may be found in Bayrd Still, Mirror for Gotham: New York As Seen By Contemporaries from Dutch Days to the Present (new York: New York University Press, 1956). See especially the bibliography, pp. 373-399.

[19] (New York: Dewitt and Davenport, 1850).

[20] (Hartford, Conn.: J.B. Burr & Co., 1868).

[21] (New York: National Publishing Co., 1872).

[22] (New York: Edgewood Publishing Co. 1882).

"The friends of virtue should awake to the moral dangers that lurk and riot and reign in this city. . . . All of the city is not above ground. There are multitudes who live and move and have their being in depths that sunlight seldom permeates." And some pages later the author concludes: "And here we leave these sketches of life in the city. It has its lights and shades, but more shade than sunshine."[23]

Or in more dramatic terms: "What a task we have undertaken, to penetrate beneath the thick veil of night and lay bare the fearful mysteries of darkness in the metropolis—the festivities of prostitution, the orgies of pauperism, the haunts of theft and murder, the scenes of drunkenness and beastly debauch."[24] Many visitors could not conceal their astonishment (and their origins) when they noted the streets of the city "thronged at midnight, as a country village at midday,"[25] and the shock of turning a corner and being greeted by the "glare and splendor of a thousand gas lights" magnified in intensity by cut glass in store fronts producing an effect which "dashes our eyes and blinds our senses."[26]

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[23] [S.I. Prime], Life in the City (New York: Robert Carter, 1847), p. 172.

[24] George G. Foster, New York By Gas-Light: With Here and There a Streak of Sunshine (New York: Dewitt and Davenport, 1850), p.5.

[25] Solon Robinson, Hot Corn: Life Scenes in New York, Illustrated (New York: Dewitt and Davenport, 1854), p. 48.

[26] Ibid.

But gas light was seen by some to have had a more positive effect than revealing the contrasts in the urban society. Lighted streets were safer passage ways than unlighted ones. "The facilities for going abroad in the evening have been greatly increased and in many streets it is as safe and agreeable to walk out in the evening as by daylight," wrote one New Yorker in 1853. "Crime too has been greatly diminished, and the evil propensities of the vicious kept in check by the absence of . . . darkness."[27] Or in the words of a visitor to the city around 1851, "When we are out at night, at an hour when honest men who can, ought to be asleep . . . we are pretty careful to keep out of the grease lighted avenues . . . and feel safer to walk a street (if it is not too long) which has but one good gas light at the end of it."[28] A large gas lamp stationed directly at the intersection of five streets in lower Manhattan, the notorious "Five Points," was said to have decreased crime in an area where once complete darkness furnished almost absolute security for the pursued thief and felon.[29]

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[27] [Daniel Curry], A Historical Sketch of the Rise and Progress of the Metropolitan City of America By a New Yorker (New York: Carlton and Phillips, 1853), p. 234.

[28] Joel H. Ross, What I Saw in New York: or a bird's eye view of city life (Auburn, N.Y.: Derby and Miller, 1851), p. 228.

[29] Foster, New York By Gas-Light, p. 53.

The sharpest impressions of amazement and delight over gas illumination came from those experiencing it for the first time, as in the visit of Japanese officials to New York in 1860, who reported: "There is a street light in front of each door which when lighted at night makes the street seem bright as day. Some of the buildings have as many as a hundred gas lights over the entrance. The light in the rooms of the houses shining through the glass windows at night is so wonderful and is such a surprise to us that I cannot describe it."[30] And a comment on the activity which gas light made increasingly possible in the evening hours: "It was quite dark when we reached the great metropolis [New York in 1868] . . . theaters, restaurants and hundreds of pleasure resorts were crowded with persons. About twenty theatres, including minstrel halls are open to the public every night."[31]

The outlines of the modern city had begun to emerge in the 60's. The beginnings of apartment houses, elevated railways, bridges to span the rivers and bind the island of Manhattan to rapidly growing suburbs,occurred against the background of an expansion of gas illumination that transformed

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[30] [Masakiyo Yanagawa], The first Japanese Mission to America (1860), Being a Diary Kept by a Member of the Embassy, tr. by Junichi Fukuyama and Roderick H. Jackson and ed. by M. G. Mori (Kobe, Japan, 1937), as quoted in Bayrd Still, Mirror for Gotham, p. 107.

[31] [Ferdinand Longchamp], Asmodeus in New York (New York: Longchamp and Co., 1868), pp. 228-39.

the physical environment and social life of the city.[32]

Gas street lighting had enjoyed an unprecedented expansion after 1850. Between 1850 and 1855 alone, the increase in total payments to the city's two gas companies for the supply of gas and the lighting and extinguishing of the public street lamps, was 61 per cent greater than the total of such expenditures for the previous 20 years.[33] New York's 9,500 gas street lamps in 1855 were lit and extinguished at a total cost to the city of $215,000.[34] By 1865, the number of lamps had increased to more than 33,000 and payments to the companies exceeded $400,000. The city's total lighting bill, in 1865, was reported to be over one-half million dollars.[35] Included under this account were expenditures for the provision of gas to City Hall, the District Courts, the Fire Departments and a number of other departments and offices, indicating that gas lighting had come into general use for the lighting of public buildings. Among the items listed in the report of 1865, was one which aroused many citizens to cries of "scandal."[36] This was an

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[32] Still, *Mirror for Gotham*, pp. 177-78.

[33] New York City Comptroller, *Annual Reports*, 1825-1865. The increase in payments between 1830 and 1850 amounted to $78,964. The increase between 1850 and 1855 amounted to $135,221.

[34] Comptroller, *Annual Report*, 1855, pp. 130-31.

[35] *Ibid.*, 1865, p. 233.

[36] "The Gas Lamps of the Ex-Mayors," *American Gas-Light Journal*, III (September 16, 1861), 89.

item providing $30 for the construction of two ornamental gas lamps on iron posts in front of the home of ex-mayor Wood.[37] According to a practice that had started many years earlier, the mayor and ex-mayors enjoyed the privilege of gas lamps on the steps in front of their homes supplied with gas and maintained without charge by the city. By 1866, there were at least five ex-mayor's residences so illuminated.[38]

There were indications by 1863 that the limited role which gas lighting played in private homes was about to change. It was reported in the early fifties that "scarcely a respectable dwelling is now built without gas fixtures."[39] Tenement houses were built to include, in addition to water, gas pipes for those with sufficient means to enjoy the advantage.[40] The design and structure of buildings began to reflect the changes introduced by gas. Houses were freed from their dependence on natural daylight. Rooms could be made broader and deeper, since light could be easily supplied despite the absence of windows. Industrial and commercial needs were better served by the possibility of using buildings on a twenty-four hour basis. The first steps were being taken toward the evolution

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[37] Comptroller, Annual Report, 1865, p. 233.

[38] New York State Assembly Documents, vol. VII , Doc. No. 183 (March 30, 1866).

[39] Ross, What I Saw in New York, p. 220.

[40] James Dabney McCabe, The Secrets and Vices of the Great City (Philadelphia: Jones Bros. & Co., 1868), p. 246.

of a completely "synthetic luminous environment."[41]

The installation of ready made gas distribution systems into the internal structures of New York's houses not only prepared the way for the introduction of domestic gas lighting but also increased the value of real estate. It was a costly and laborious proposition to install gas light in houses for which no provisions for installation had previously been made. Walls and floors had to be ripped apart at great expense. Advertisements for the sale of homes after 1830 sometimes included the information that gas mains were conveniently located nearby or that the building in question had been piped for gas.[42] The sharp rise in realty values beginning about mid-century is said to have been due in part to the increased use of gas lighting.[43]

The impact of the introduction of gas lighting upon the government of the city has been considerable. Bitter struggles often divided the Common Council over the question of whether or not to grant a state created gas company the right to use the city streets. The pre-Civil War period saw a progressive effort on the part of the Common Council to

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[41] James Marston Fitch, American Building: The Forces That Shaped It (Boston: Houghton Mifflin Co., 1948), p. 64.

[42] "Father Knickerbocker," Gas Logic, XXXIII (April 1923), 12.

[43] "Gas As A Factor in City Growth," Harlem Magazine, (January, 1917), 13. Also, Robert E. Livingston, "One Contributing Cause for Growth," Record and Guide, (February 3, 1917), 41.

safeguard the city from abuses and omission in the granting gas franchises. The major faults which emerged in the agreement with New York's first gas company in 1823 seemed mainly to have been due to lack of previous experience and knowledge, both on the part of the company and the city. The grant to the Manhattan company sought to correct some of the weaknesses which had become sources of difficulty by 1833. The privilege of an exclusive right to a gas district was expressly denied. The location of the company's gas works was regulated by the terms of the contract and confined to regions in the vicinity of the Hudson and East rivers, north of the populated areas. Stronger limitations were placed on the company's right to open pavements for its gas mains and a city employee, paid by the company, was to supervise the process of replacing the torn pavement.[44]

Gas was only one of the many kinds of public franchises which came under public attack by municipal reform groups in the 1840's and 1850's. The amended city charter of 1853 was an attempt to deal with franchise abuses by providing for open bidding on public contracts. Despite these precautions, the bribery of public officials for the acquisition of franchise rights was alleged to be one of the widespread abuses that contributed to the corruption of

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[44] For a comparison of the terms of city gas contracts, see New York City Street Commissioner, Second Quarterly Report, 1865, pp. 102-106.

city government.[45] These allegations were often the comments of progressives and urban reformers when writing and speaking about the antebellum period nearly half a century later. They ignored, or seemed to ignore, the bitter struggles of the 1850's in which New Yorkers, in and out of the Common Council, challenged the right of gas companies to renewal of their gas contracts and insisted on lower gas rates for consumers. Seth Low, a typical progressive and former Mayor of Brooklyn, spoke of gas franchises being "given away" during the 1850's. Low also contended, and quite correctly, that it had been an error at that time for the municipality to have insisted on establishing competition among gas companies. The waste due to duplication of facilities had made price reductions almost impossible to obtain. The city of Paris had given a single corporation the right to provide gas for public and private needs. As a result, the city had obtained benefits which might have gone into the pockets of private stockholders and consumers were protected from overcharges on their gas supply. The solution, according to Low, was to clearly recognise the need for monopoly in the provision of gas but to institute controls over the gas company by the city which would be to the advantage of public and private consumers of gas.[46]

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[45] Gustavus Myers, The History of Public Franchises in New York City (New York: Reform Club Committee on City Affairs, 1900); also, Samuel Augustus Pleasants, Fernando Wood of New York (New York: Columbia University Press, 1948), pp. 39-45.

[46] Seth Low, New York in 1850 and 1890 (New York: New York Historical Society, 1892), pp. 27-8.

In his later analysis of the situation in 1850, Low overlooked a number of important historical factors. A New York company was given a monopoly in 1823 but the conflict over gas rates and other charges which began in 1825 and continued for many years thereafter, caused New Yorkers to seek a solution to the gas question by means of rival companies. The technology of gas lighting was an additional factor. The problems of distribution of gas through mains over long distances had not, in the early part of the 19th century, been satisfactorily resolved. As New York's population moved northward through the island of Manhattan, the regions furthest away from the vicinity of gas works were deprived of gas light despite pressing need. The solution adopted, the division of Manhattan into gas districts, allowed for more intensive growth of the gas network and may well have been the most effective way of coping with the growth and distribution of the city's population.

The work done in New York in the development of its gas supply was in turn to be an important factor encouraging urbanization in the nation. The city's gas companies had made decisive contributions to the development of gas lighting technology in the United States. The Manhattan Gas Light Company regularly employed engineers and scientists to evaluate reports and to investigate new processes and equipment. It carried on its own experiments in its famous "laboratory" at the plant on 18th Street near the Hudson River, which was

in itself one of the sights of the city.[47]

The city's gas companies had demonstrated the feasibility of central plant distribution of power and light, probably the most significant of all the contributions mentioned so far. Gas mains created a dependence of consumers and the public on a company to an extent unprecedented in the history of technology. Water pipes antedated gas but always remained a far less complicated operation. The change from gas to electricity was an imitative one, since central station installation was already an established principle and the nature of the relationship between companies and the public resembled in form, if not in content, what had gone on before.

Finally, the gas industry of the nation was greatly enriched when there was established in New York City, in the summer of 1859, the first national publication devoted to coordination and dissemination of materials of interest to gas companies, the public and growing cities. The American Gas-Light Journal announced its intention to instruct and represent the public in matters of light, water and public health.[48] The Journal collected and published data on gas

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[47] Thomas J. Watson, "Gas and Gas Making," Harper's New Monthly Magazine, XXVI (December, 1862), 20.

[48] The first issue appeared on July 1, 1859 and was, as the publisher, John B. Murray and Co., Bankers, No. 40 Wall Street, New York City, noted, intended as a "Price Current of the Gas Light Shares of a few of the principal cities." The second issue of August 1, 1859 assumed the

light companies in the United States and publicized areas or communities seeking capital and technological resources for the installation of gas lighting.[49] In subsequent disputes between consumers and gas companies, it sought to occupy neutral ground much to the displeasure of the companies. Coming at the end of an era of great progress in the manufacture and distribution of gas lighting, the Journal's enthusiasm for the introduction of gas light assumed the character of a civic crusade. Gas lighting had lifted the city out of darkness and promised to meliorate the ills which industrialism and urbanization had created.[50]

After 1863 the gas lighting industry underwent many changes. Electric lighting began to be heard of in the 1880's and was conceded to be the light of the future by 1900. As late as 1927, 40 miles of Brooklyn streets were lighted by gas but these lamps were dismantled the following year.[51] Historic remnants of the gas light era remain today in two

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format which the Journal subsequently took. Underneath the title on its mast-head was the statement "The Representative of Light, Water and the Public Health." See vol. I, American Gas Light Journal.

[49] Ibid., (August 1, 1859), pp. 2-3.

[50] Asa Briggs, Victorian Cities (New York: Harper and Row, Publishers, 1963), pp. 220-221.

[51] Rebecca B. Rankin, "New York City Lighting History." A mimeographed manuscript in the files of the Municipal Reference Library (branch of the New York Public Library), New York City.

lamps burning continuously in MacDougal Alley in Greenwich Village;[52] but except for this and modern imitations prompted by nostalgia,[53] the world of manufactured gas works has vanished from the city.

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[52] These lamps at 8 and 15 Macdougal Alley were discontinued in February 1942 as a result of the dim-out imposed by the war. They were relighted again in September, 1945. The gas is now provided free-of-charge for perpetuity by the Consolidated Edison Company of New York City. See Herald Tribune, October 10, 1945. The flame in these lamps is provided by gas mantles, a development in gas lighting occurring at the end of the 19th century, and unlike the open flame jets of the period we have been considering. See Frederick L. Collins, Consolidated Gas Company of New York (New York: Published by Con Ed., 1934), pp. 120,210-213.

[53] New York Times, August 10, 1966.

APPENDIX A

GAS RATES OF NEW YORK CITY GAS COMPANIES, 1825-1863*

(per 1000 cubic feet)

	New York	Manhattan	Harlem	Metropolitan
Jan 1825	$10.00			
May 1828	9.00			
Nov 1829	8.00			
Feb 1830	7.00			
May 1833		$7.00		
Mar 1836		6.00		
Oct 1838		5.00		
Dec 1838		4.50		
Jan 1839		4.00		
Feb 1849	6.00			
Aug 1849	5.00			
Nov 1849	4.00			
May 1850	3.50			
Jan 1851		3.50		
Jan 1852	3.00	3.00		
Oct 1856		2.50		
Nov 1856	2.50			
Feb 1857				
Jan 1860				
Feb 1861	2.50	2.50		
Jan 1862			$3.00	
Jun 1863				$2.50

* Based upon tables in John H. G. Pierson, "Origins of the Consolidated Gas Company of New York," Appendix D, MS in the files of the Consolidated Edison Company of New York.

Gas rates included meter rental until February 1861. Meter rentals were ended by all New York City gas companies after this date.

APPENDIX B

PRIVATE AND PUBLIC GAS LAMPS IN SEVERAL CITIES COMPARED, 1859*

City	Population of Gas District	Private Gas Consumers	Gas Street Lamps	Rates Per 1000 Cubic Feet	Private Gas Consumers as % of Gas Dist Population
Baltimore	100,000	8,300	1,820	$2.50	8.3%
Boston	200,000	10,410	2,265	$2.50	5.2%
Philadelphia	650,000	32,000	5,000	$2.25	4.9%
New York					
Manhattan Co	600,000	26,000	9,000	$2.50	4.3%
New York Co	100,000	13,000	3,150	$2.50	13. %
Harlem Co	25,000	700	1,800	$3.50	2.6%
Total NYC	725,000	56,000	13,960		7.9%

* Compiled from "Tables of the Gas-Light Companies of Cities and Towns, Corrected September 30, 1859," *American Gas-Light Journal*, I (October 1, 1859), pp. 52-53.

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